A Guide to TracVision® G8

owner's manual

- Guide to Operation
- Guide to Technical Information

Satellite Television

KVH® TracVision G8

TVG8_OM_BinderCover_9.03

TracVision G8 Quick Reference Guide

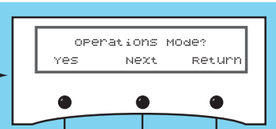
MCU Main Display

Select Satellite A

Select Satellite B

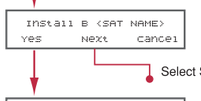
For complete details about the TracVision G8 menu functions, refer to Section 3, "Using the MCU Interface," *in the* Guide to Technical Information.

MCU Main Menu

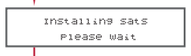


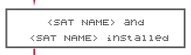
Return to "Install Satellite"

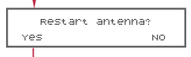
Select Satellite A



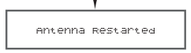
Select Satellite B

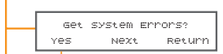




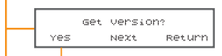


Restart Antenna

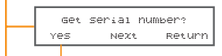




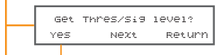
Errors Detected *



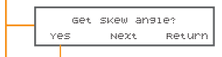
Antenna Type and Version *



Antenna Serial Number *

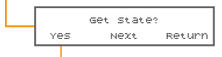


Threshold and Signal Levels *

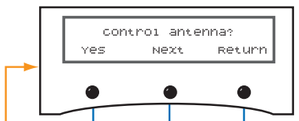


LNB Skew Angle *

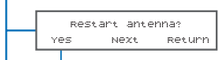
Bit Error Rate *



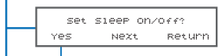
Current State *



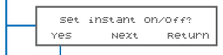
Adjust Azimuth/Elevation



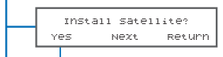
Antenna Restarts



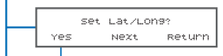
Sleep Mode On/Off



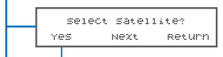
Instant On Mode On/Off



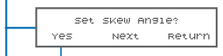
Install Satellite Pair



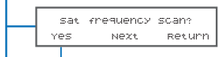
Set Latitude/Longitude **



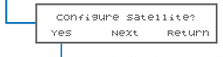
Select Active Satellite



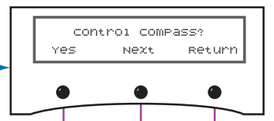
Set Skew Angle

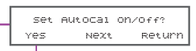


Update Frequency Data

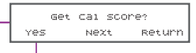


Set Frequency, Symbol Rate, FEC Code, and Network ID

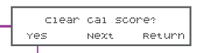




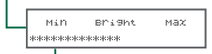
Autocalibration On/Off



Calibration Accuracy, Magnetic Environment, and Calibration #



Clear cal score



Set Display Brightness

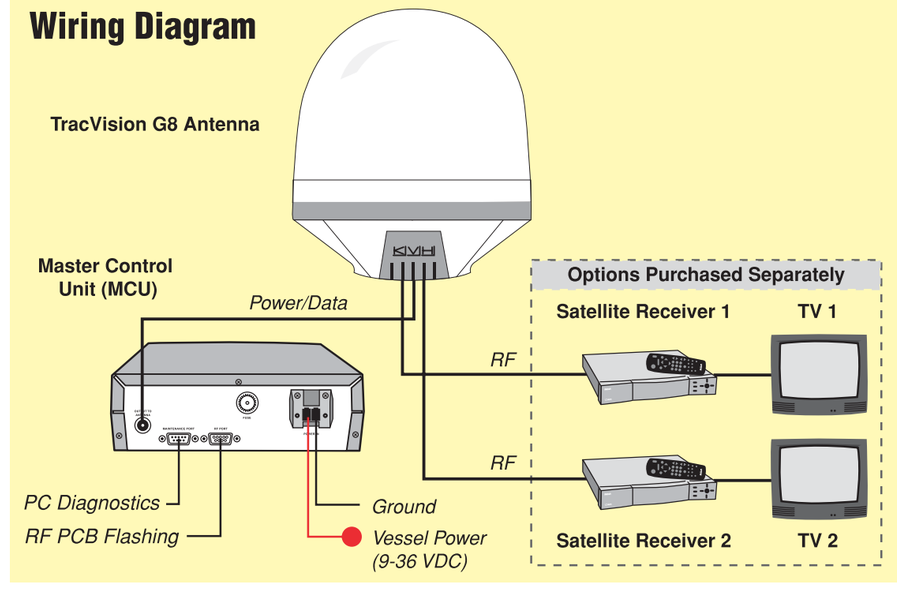
Return to "Get Antenna Status"

Notes

* *Press any button to return.*

** *If GPS is providing valid position data to the antenna, manual entry of latitude/longitude is not available.*

Wiring Diagram



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TracVision G8

Owner's Manual

This manual provides detailed instructions on the proper operation, installation, configuration, troubleshooting, and maintenance of the KVH TracVision G8 system. For operation instructions, refer to the *Guide to Operation*. For installation, configuration, troubleshooting, and maintenance instructions, refer to the *Guide to Technical Information*.

Throughout this manual, important information is marked for your attention by these icons:

A helpful tip that either directs you to a related area within the manual or offers suggestions on getting the best performance from your system.

An alert to important information regarding procedures, product specifications, or product use.

Information about installation, maintenance, troubleshooting, or other mechanical issues.

An electrical safety warning to help identify electrical issues that can be a hazard to either this KVH product or a user.

TracVision G8 Serial Number

This serial number will be required for all troubleshooting or service calls made regarding this product.

Direct questions, comments, or suggestions to:

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Click here to go to our state-of-the-art Customer Support web page... the fastest and easiest way to get all of your questions answered.

ISO 9001

KVH Part # 54-0198 Rev. C

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Guide to Operation

This guide explains everything you need to know to operate your TracVision G8 system. For detailed installation, configuration, troubleshooting, and maintenance information, please refer to the *Guide to Technical Information*.

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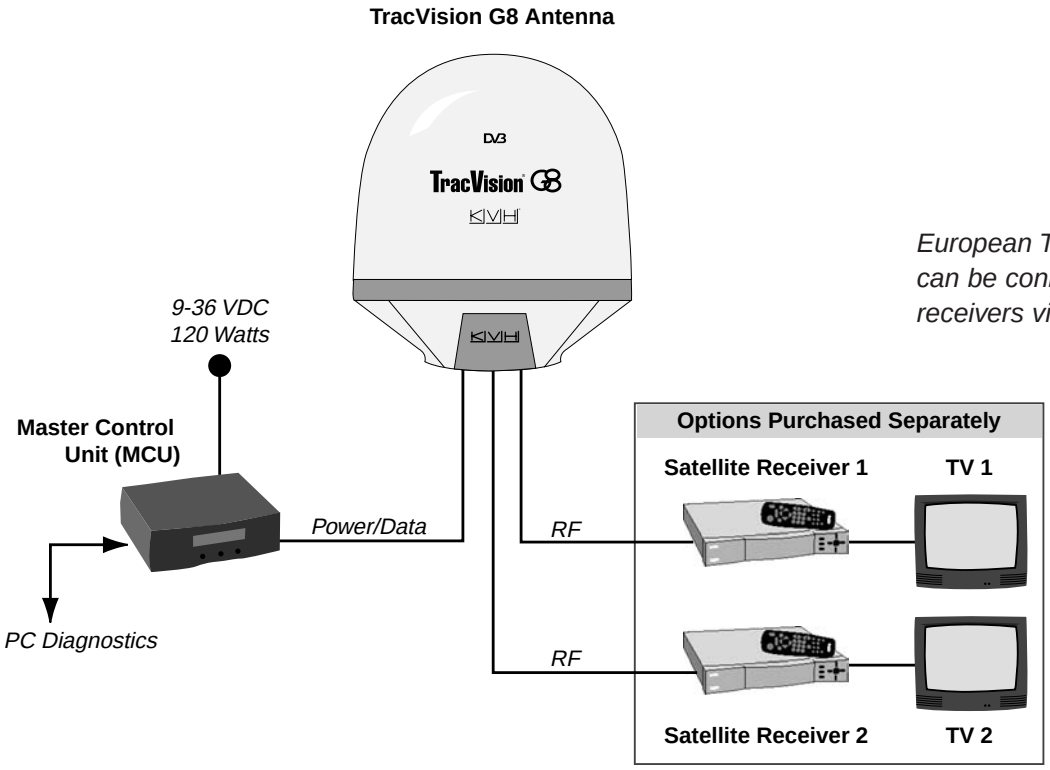
1 System Overview

A complete satellite TV system, illustrated in Figure 1, includes the TracVision G8 antenna unit connected to the Master Control Unit (MCU), an IRD (satellite TV receiver), and a television set.

Figure 1
TracVision G8 System Diagram

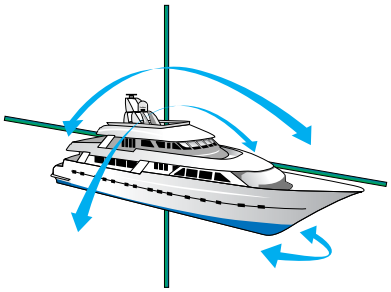


European TracVision G8 systems can be connected to four satellite receivers via four RF cables.

System Compatibility

The TracVision G8 is fully compatible with Digital Video Broadcasting (DVB®) satellites, as well as DIRECTV®'s Digital Satellite Service (DSS) satellites. The system is also fully compatible with KVH's TracNet™ 2.0 Mobile High-speed Internet System (for more information about TracNet 2.0, please visit our web site at *www.kvh.com*).

Figure 2
TracVision Identifies and Compensates for Vessel Motion



In-motion Tracking

The TracVision G8 uses a state-of-the-art actively stabilized antenna system. The antenna's built-in global positioning system (GPS) allows the system to calculate the precise azimuth and elevation to the satellite from your vessel's current location, ensuring the shortest possible satellite acquisition time. Once the satellite is acquired, the antenna gyros continuously measure the heading, pitch, and roll of your vessel and send commands to the antenna motors to keep the antenna pointed at the satellite at all times.

Satellite Library

Your TracVision G8 includes a pre-programmed satellite library of North American, European, and Latin American satellite services. If the satellite service you wish to receive is not already in the satellite library, an authorized technician can add two additional satellites of your choice to the library.

System Components

Your TracVision G8 system includes the following components:

Antenna Unit

The antenna unit houses the antenna positioning mechanism, low noise block (LNB), GPS, and three-axis sensor within a molded ABS radome. The European version includes a skew control mechanism that automatically adjusts the antenna's skew to account for regional changes and different satellite services. Power, signal, and control cabling from belowdecks units are connected to the antenna at the rear of the baseplate.

Master Control Unit

The MCU is the user interface, providing access to the system and its functions through an LCD and three soft keys. The MCU also serves as the system's junction box, allowing the system to use ship's power and supply and receive data to/from the TracVision G8. The MCU can accept any power input between 9 and 36 volts DC; its power supply provides power to the antenna and galvanically isolates the TracVision G8 system.

Integrated Receiver Decoder (IRD)

The IRD (purchased separately) receives satellite signals from the antenna unit for signal processing and channel selection, and sends the signals to the TV set for viewing. Please refer to the user's manual provided with your selected IRD for complete operating instructions.

2 Receiving Satellite Signals

For TracVision G8 to receive satellite TV signals, the antenna must have a clear line of sight to the satellite. If you only receive intermittent signals or the antenna cannot find the satellite, check around your vessel for any objects that could be blocking the signal, such as other vessels, trees, buildings, other onboard equipment, etc.

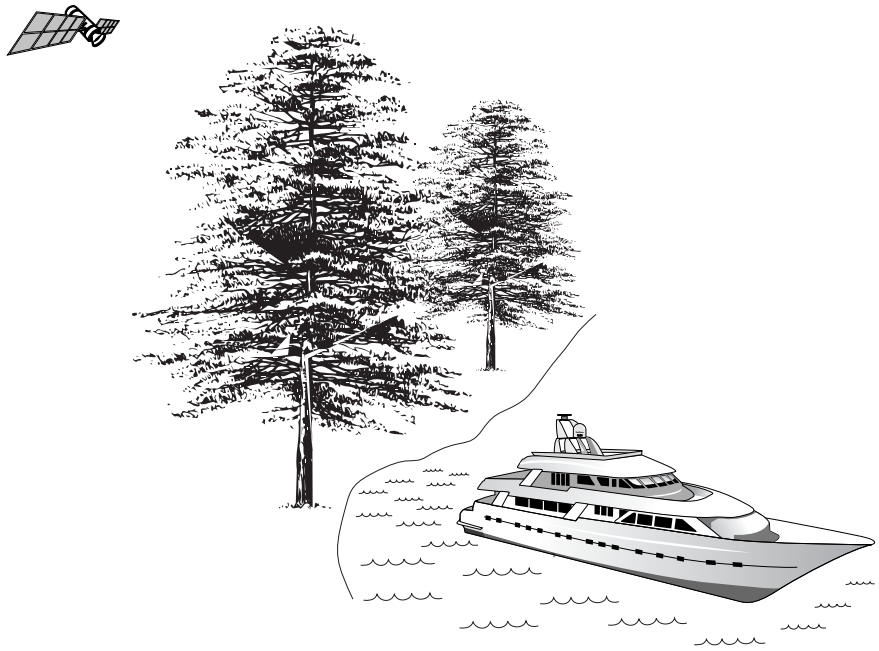


Figure 3
Be Aware of Objects that Might Block the Satellite Signals

You must also be located within the selected satellite's coverage area in order to receive its signal. Refer to your satellite television service manual to check the viable coverage area. *For your convenience, KVH provides links to several web sites that offer satellite coverage information. Simply go to our web site at: www.kvh.com/footprint/index.html.*

3 Turning On the System

The TracVision G8 system is easy to use. Antenna unit initialization and satellite acquisition are completely automatic.

To use the TracVision G8 system, follow the steps below.

1. Turn on the IRD and the television. (Refer to your IRD user's manual for complete operating instructions for the IRD.)
2. Apply power to the TracVision G8 antenna.
3. Minimize turning the vessel for two minutes after turning on the antenna to allow the antenna gyro to initialize properly.

To minimize the time it takes the antenna to acquire the satellite, do not change the channel during the startup process or cable unwrap.

4 Changing Channels and Switching to the Second Satellite

TracVision G8 can have a pair of satellites installed, either one of which can be the active satellite selection. There are several methods of selecting whether your TracVision G8 will track Satellite A or Satellite B based upon your location, type of install, IRD, and selected satellite service.

European Satellite Subscribers

If you are not using a multiswitch, switching from one satellite to the other is as easy as changing the channel using the IRD remote control. TracVision G8 will automatically switch from Satellite A to Satellite B and back again as necessary to receive your selected channel. If you are using a multiswitch, use the MCU switching option described in *"Switching Satellites Using the MCU" on page 8*.

DIRECTV Satellite Subscribers

DIRECTV subscribers in certain regions of the United States will require a DSS Plus™ IRD to receive broadcasts from multiple satellites.

If connected to the antenna's RF1 connector, the DSS Plus IRD allows you to switch channels using the IRD remote control. If you are a DIRECTV subscriber, but do not have a DSS Plus IRD, or you are using a multiswitch, use the MCU switching option described in *"Switching Satellites Using the MCU" on page 8*.

EchoStar and ExpressVu Satellite Subscribers

EchoStar and ExpressVu subscribers will need to use the MCU switching option, as described in *"Switching Satellites Using the MCU" on page 8*.

DIRECTV Latin America Subscribers

If your TracVision G8 is equipped for use with the DIRECTV Latin America service, your antenna will search for and receive signals from one satellite (Galaxy 8W or Galaxy 8E). Therefore, there is no need to switch satellites.

The satellite configuration on your IRD must match the satellite setting on the TracVision G8 system.

*Satellite A on the TracVision G8 must be the same satellite as IRD Alternative 1 (or A, based on your IRD) and must be assigned the IRD DiSEqC 1 setting.**

*Satellite B on the TracVision G8 must be the same satellite as IRD Alternative 2 (or B, based on your IRD) and must be assigned the IRD DiSEqC 2 setting.**

Refer to your IRD user manual for complete instructions for your IRD.

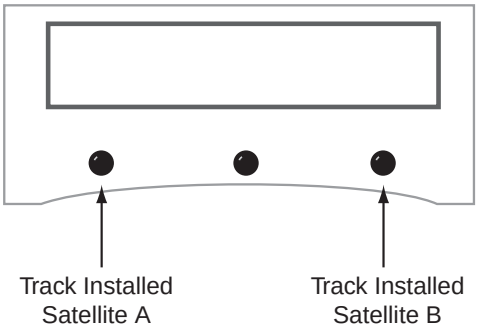
**DiSEqC settings only apply to European systems and DIRECTV DSS Plus™ IRDs.*

When you switch from one satellite to another, all IRDs connected to the system will receive signals from the new satellite.

Switching Satellites Using the MCU

If you're unable to switch between satellites using the IRD remote control, use the MCU front panel buttons to select between Satellite A and Satellite B. Press the left button to select Satellite A and the right button to select Satellite B.

Figure 4
Switching Satellites Using the MCU



European systems only:
Using the MCU to switch between satellites disables the system's DiSEqC monitoring. You will not be able to use the IRD to switch between satellites unless the system is restarted.

5 Watching Television

TracVision G8 is designed to operate as efficiently and as reliably as possible both when your vessel is in motion and at rest.

Cable Unwrap

The antenna can rotate a full 720° before reaching the end of its cable. If it does so, the system automatically unwraps the cable by quickly rotating the dish in the opposite direction. During this time, your television transmission will freeze momentarily while the cable unwraps and the antenna reacquires the satellite.

Conical Scan Tracking

The antenna uses conical scanning to maintain peak signal strength to the receiver and to update the satellite's position. When conical scan tracking is active, the antenna moves continually in a circular motion to sweep across the satellite's peak signal. The signal strength is then fed back to the control circuits to keep pointed in the direction of the strongest signal.

If the satellite signal is lost while the system is in conical scan track mode, the control software imposes a 15-second time-out delay. If the signal is not regained during that time, the antenna will search for the satellite signal. This is an automatic process that does not require user intervention.

Sleep Mode

When the vessel has come to a stop and holds its position for one minute (e.g., at a dock), the antenna unit enters Sleep Mode, which locks the antenna in place to conserve power. As soon as the vessel moves beyond a 1° - 2° window, or the RF level changes significantly, Sleep Mode automatically turns off and the system begins tracking the satellite again (or enters Search mode to find the satellite).

If you prefer, you may disable the Sleep Mode function. Refer to "Turning Sleep Mode On/Off" on page 70 *for details.*

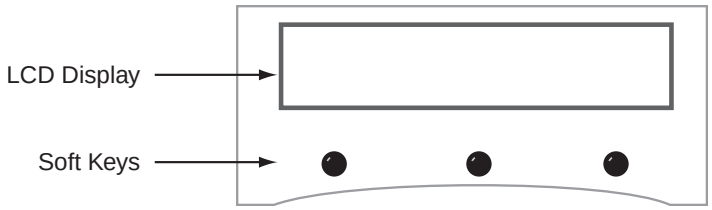
6 Internet Access

Your TracVision G8 can receive high-speed Internet data when used in conjunction with KVH's TracNet 2.0 Mobile High-speed Internet System. With TracNet 2.0, you get broadband Internet access on the move via satellite downloads and a wireless return path. For more information about TracNet 2.0 in North America and Europe, please visit our web site at *www.kvh.com*.

7 Using the MCU Interface

All TracVision G8 operations are controlled and monitored using the MCU. An LCD display shows configuration data and three soft keys enable you to perform basic menu-driven tasks.

Figure 5
MCU Front Panel



During the TracVision G8 installation process, the satellite selections should have been configured to your specifications as detailed in the *Guide to Technical Information.* Once the system is installed and functioning properly, the system will function automatically.

However, there may be instances in which you need to access certain settings via the MCU interface. To assist you, KVH has provided the following information resources:

Quick Reference Guide:
The quick reference guide on the inside front cover of this manual illustrates the main display and the overall menu structure, allowing you to easily and quickly navigate among the MCU menus.

Section 3 in the *Guide to Technical Information*:
Section 3, "Using the MCU Interface," on page 57 of the *Guide to Technical Information* provides a detailed explanation of every menu option and system configuration setting. These menus should, for the most part, be accessed by authorized technicians. The following are the most commonly used menu functions:

Table 1
Commonly Used Menu Functions

Menu Function	Purpose	See Page:
Install Satellite	Install a satellite to track	63
Set Sleep On/Off	Turn Sleep Mode on or off	70
Set Brightness	Adjust the MCU display's brightness	80

Guide to Technical Information

This guide explains how to install, troubleshoot, and maintain the TracVision G8 system. For complete operation instructions, please refer to the *Guide to Operation* at the front of this manual.

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2 Installation 19

3 Using the MCU Interface 57

4 Troubleshooting 81

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Appendices 125

1 — Introduction

This section provides a basic overview of the TracVision G8 system. It explains how the system works and describes the function of each component.

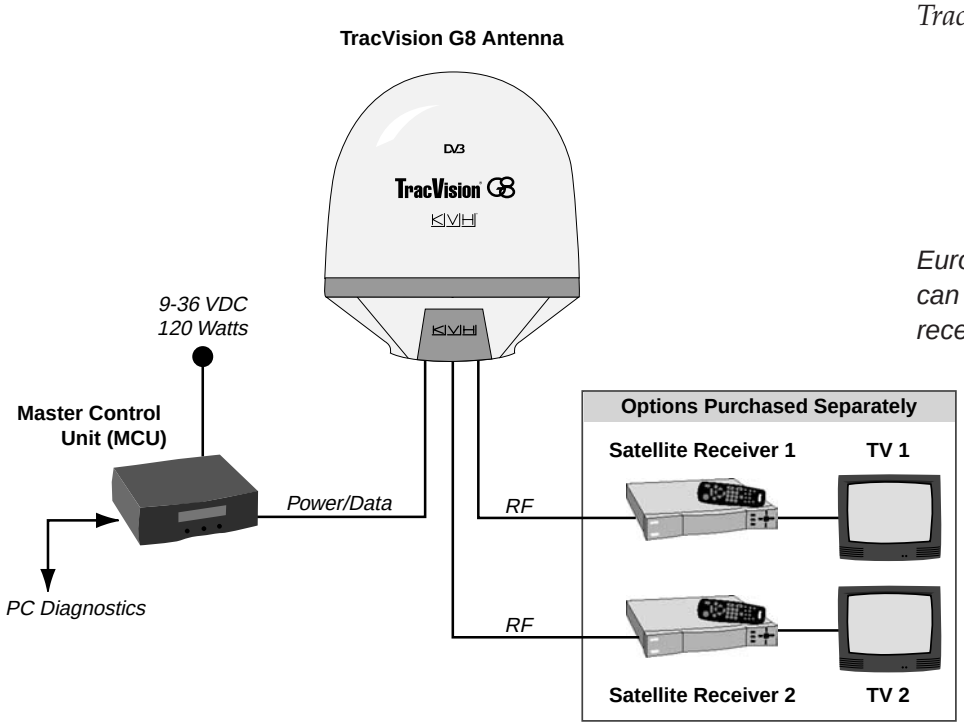
Contents

1.1 System Overview 15
1.2 System Components 17
1.3 Materials Provided with the TracVision G8 18

1.1 System Overview

A complete satellite TV system, illustrated in Figure 1-1, includes the TracVision G8 antenna unit connected to the Master Control Unit (MCU), an IRD (satellite TV receiver), and a television set. A desktop or laptop computer is used to conduct diagnostics. *System specifications are provided in Appendix A on page 127.*

Figure 1-1
TracVision G8 System Diagram

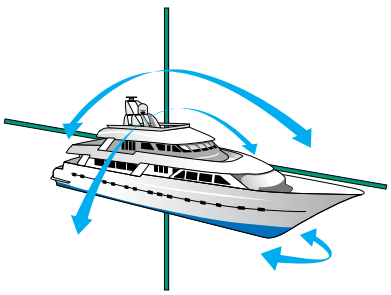


European TracVision G8 systems can be connected to four satellite receivers via four RF cables.

System Compatibility

The TracVision G8 satellite antenna is fully compatible with Digital Video Broadcasting (DVB®) satellites, as well as DIRECTV®'s Digital Satellite Service (DSS) satellites. The system is also fully compatible with KVH's TracNet™ 2.0 Mobile High-speed Internet System (for more information about TracNet 2.0, please visit KVH's web site at *www.kvh.com*).

Figure 1-2
TracVision Identifies and Compensates for Vessel Motion



In-motion Tracking

The TracVision G8 uses a state-of-the-art actively stabilized antenna system. The antenna's built-in GPS allows the system to calculate the precise azimuth and elevation to the satellite from your vessel's current location, ensuring the shortest possible satellite acquisition time. Once the satellite is acquired, the antenna gyros continuously measure the heading, pitch, and roll of your vessel and send commands to the antenna motors to keep the antenna pointed at the satellite at all times.

TracVision G8's default satellite pairs are:

N. America (US DIRECTV):
DSS_101 & DSS_119

Europe:
Astra1 & HotbirdWB

L. America (DIRECTV LA):
Galaxy_8W & None

Satellite Library

Your TracVision G8 includes a pre-programmed satellite library of North American, European, and Latin American satellite services. When configuring the TracVision G8, you may choose a pair of satellites from the library to be active in the system and with your IRD.

Table 1-1 lists the possible satellite pairs that may be selected in North America, and Table 1-2 lists the satellites that can be programmed in Europe (as long as the paired satellites are within range of the TracVision antenna). In Latin America, the system can track either Galaxy_8W or Galaxy_8E to receive DIRECTV Latin America service (Latin American LNB required). *If the satellite service you wish to receive is not listed in the satellite library, you may add two additional satellites of your choice to the library.*

Table 1-1
Available Satellite Pairs - North America (North American LNB Required)

	DSS_101	DSS_119	Echo_61	Echo_110	Echo_119	Echo_148	Expressvu	ExpressTV
DSS_101		✓					✓	✓
DSS_119	✓						✓	✓
Echo_61				✓	✓		✓	✓
Echo_110			✓		✓	✓	✓	✓
Echo_119			✓	✓		✓	✓	✓
Echo_148				✓	✓		✓	✓
Expressvu	✓	✓	✓	✓	✓	✓		✓
ExpressTV	✓	✓	✓	✓	✓	✓	✓	

Table 1-2
Available Satellites - Europe (European LNB/Feed Tube Assembly Required)

Any two of the European satellites listed below can be paired together, as long as the satellites are within range of the antenna:

- Astra1
- Astra2N
- Astra2S
- Hispasat
- HotbirdWB
- Hotbird
- Sirius
- Thor
- Arabsat
- Nilesat
- Optus_B1
- Optus_B3

1.2 System Components

Your TracVision G8 system includes the following components:

Antenna Unit

The antenna unit houses the antenna positioning mechanism, low noise block (LNB), GPS, and three-axis sensor within a molded ABS radome. The European version includes a skew control mechanism that automatically adjusts the antenna's skew to account for regional changes and different satellite services. Power, signal, and control cabling from belowdecks units are connected to the antenna at the rear of the baseplate.

Master Control Unit (MCU)

The MCU is the user interface, providing access to the system and its functions through an LCD and three soft keys. The MCU also serves as the system's junction box, allowing the system to use ship's power, and supply and receive data to/from the TracVision G8. The MCU can accept any power input between 9 and 36 volts DC; its power supply provides power to the antenna and galvanically isolates the TracVision G8 system.

Integrated Receiver Decoder (IRD)

The IRD (purchased separately) receives satellite signals from the antenna unit for signal processing and channel selection, and sends the signals to the TV set for viewing. Please refer to the user's manual provided with your selected IRD for complete operating instructions.

Before you can start watching satellite TV using your TracVision antenna, you will need to activate your IRD. Refer to Section 2.6, "Activating/Programming the IRD," on page 40 *for details.*

1.3 Materials Provided with the TracVision G8

Table 1-3 lists the components and materials in the TracVision G8 shipping carton.

Table 1-3
TracVision G8 Packing List

For a list of items supplied in the kitpack, see Table 2-3 on page 22.

Component	KVH Part No.
Antenna unit	02-1262-01† 02-1262-03†† 02-1262-04†††
Master control unit (MCU)	02-1265
Installation kitpack	72-0127
Data/power cable, 100 ft. (30 m)	32-0744-100
TracVision G8 Owner's Manual	54-0198

† North American system
†† Latin American system
††† European system

2 — Installation

This section explains how to install, configure, and test the TracVision G8 system. Follow the simple procedures in this section sequentially to ensure a safe and effective installation.

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2.2 Mounting the TracVision Antenna 26
2.3 Connecting the IRD(s) 31
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2.6 Activating/Programming the IRD 40
2.7 Installing Satellites Using the MCU 42
2.8 Checking Out the System 52
2.9 Changing Geographic Location 54

2.1 Planning the Installation

Who Should Install the TracVision G8

KVH recommends that a KVH-authorized technician install the TracVision G8 system. Installers should have experience installing electronic equipment on a vessel.

Materials and Equipment Required for Installation

Before you begin installing the TracVision G8 system, you need to verify that you have all of the following tools and materials:

- Electric drill and ½" (13 mm) drill bit
- 17 mm socket wrench
- 7/16" open-end wrench
- Flat head and Phillips screwdrivers
- Light hammer; center punch; tape; scriber/pencil
- Wire strippers
- A PC with terminal emulation software such as Windows Hyperterminal or PROCOMM
- Quick-tripping circuit breaker or fuse rated for 30 amps
- RG-11 cable(s) with F-type connectors (*refer to Table 2-1 to determine the number of RF cables needed)*

Connecting to:	# RF Cables
North American Systems	
One IRD	1
Two IRDs	2
Two or more IRDs	2*
European Systems	
One IRD	1
Two IRDs	2
Three IRDs	3
Four IRDs	4
More than four IRDs	4*

** Multiswitch required. Follow manufacturer's guidelines.*

Plan the entire installation before proceeding! Take into account antenna unit placement, cable running distances between units, and accessibility to the equipment after installation.

If you are prewiring the system, be sure to route the N-type connector end of the data/power cable to the antenna location and the F-type connector end to the belowdecks MCU (see Figure 2-8 on page 28).

RG-11 with F-type connectors is required for all RF wiring. Use of any other cable will result in degraded performance, which is not covered by the KVH warranty.

Table 2-1
Number of RF Cables to Connect to the Antenna

You may want to connect four RF cables to the antenna in all cases. That way, if an IRD is added (or the system is converted from North American to European use) in the future, no additional RF cables will need to be run.

- Power cable to connect the MCU to ship's power (Table 2-2 provides proper gauge and length specifications for a 12V supply. The system will not work if the MCU receives less than 9V).

Table 2-2
Recommended MCU-to-Ship's Power Cable Specifications

Cable Length	Cable Gauge
to 40 ft (12 m)	12 AWG (1.5 mm^2)
up to 70 ft (21 m)	10 AWG (2.5 mm^2)

Kitpack Contents

The kitpack packaged with your system contains hardware and other materials that will be needed to complete the installation. Ensure that the kitpack contains all of the items listed below.

Table 2-3
Kitpack Contents

Part	Part #	Qty.
M10 x 1.5 x 50 mm hex head bolts	14-0342-50	4
M10 flat washers	14-0344-10	4
M10 lock washers	14-0343-10	4
M4 x 0.7 x 8 mm pan-head Phillips screws	14-0075-08	6
Plastic screw covers	19-0088	8
Rear logo plate	20-0885-02	1
Power connector plug	23-0497-02	1
IRD ground cable	32-0583-50	1
PC cable *(for diagnostics)*	32-0628-06	1
PC cable gender changer	23-0517-09	1
Flush mount MCU bracket	20-0667	1
Velcro self-adhesive backings	19-0146	4
Velcro washers	19-0147	4
#4-24 thread-forming screws	14-0150-06	4
Tie-wraps	22-0006	5
#8 type A screws	14-0047-08	4
#8 lock washers	14-0038	4
#6-32 x ½" pan head screws	14-0029-08	2
#6 flat washers	14-0024	2
Small Ferrite Coil	29-0088	1
Large Ferrite Coil	29-0090	1
F-type connector	23-0213	1

Choosing Component Locations

When determining component locations, first keep in mind accessibility and cable lengths between units. For example, since the data/power cable is 100 ft (30 m) long, the MCU must be located within 100 ft (30 m) of the antenna.

The major considerations in locating the TracVision components are described below.

Choosing the Best Location for the TracVision Antenna

There are several factors to consider when choosing the location for the TracVision antenna.

- Since the TracVision antenna requires a clear view of the southern sky to receive satellite signals, the ideal antenna site has an unobstructed view of the horizon/satellite all around. The less blockage, the better the system performs.
- Keep the antenna clear of any obstructions above decks. The antenna requires a -15º to +85º look angle to receive satellite signals.

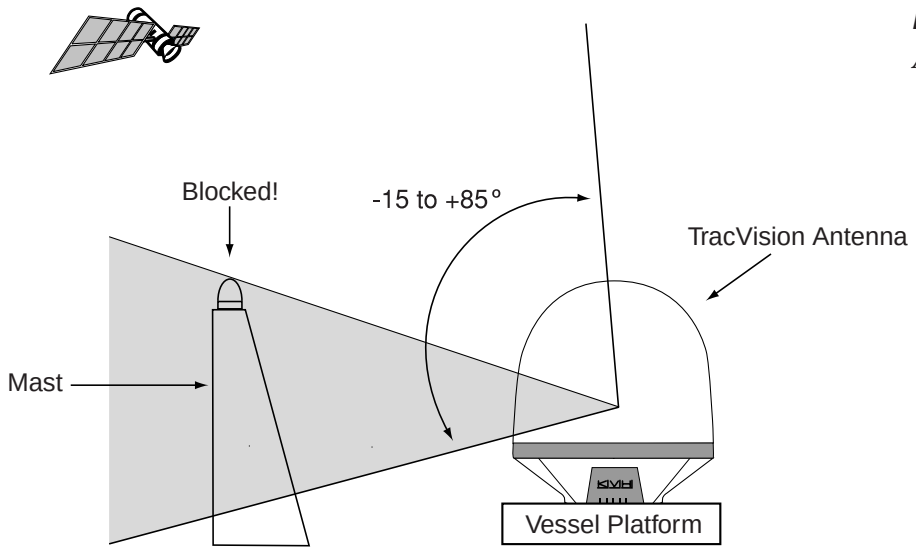


Figure 2-1
Antenna Blockage

- To minimize tracking errors, place the antenna unit as close as possible to the intersection of the vessel's fore-and-aft centerline and midships. The antenna unit need not be located exactly on the vessel's fore-and-aft axis, but its centerline MUST be parallel to it.

- The mounting surface should be flat and strong enough to carry the complete assembly (85 lbs/ 38.6 kg). To prevent warpage to the antenna baseplate, make sure that the mounting surface is rigid so that it cannot flex when the vessel vibrates. If necessary, add a strength member to the mounting site to stiffen it.
- Be sure to account for the height and base dimensions (see Figure 2-2 on the following page). Also be sure to leave enough space outside the access hatch to allow a technician to remove the seven hatch screws and perform maintenance through the hatch.
- Maintain at least four feet (1.3 m) separation between the antenna and any magnetized materials, large ferrous masses, cranes, engines, derricks, other antennas, cables carrying high amperage direct current, or battery banks. Take extra care when mounting the antenna on a steel vessel; use an aluminum, brass, plastic, or wood (NOT steel or iron) platform to position the antenna at least four feet (1.2 m) above and six feet (1.8 m) away from the steel surface.
- Be alert for devices that change their magnetic characteristics when in use, such as CRTs (computer and TV screens), radar magnetrons, electric winches, loudspeakers, windshield wipers, and other devices with DC motors. The antenna's internal sensor cannot compensate for changing magnetic fields created by these devices.

Radar Concerns

The TracVision antenna must be kept out of line with nearby radars, as their energy levels (from both the main beam and its side lobes) may overload the antenna's front-end circuits. In an ideal installation, the antenna is mounted four feet (1.2 m) above and four feet (1.2 m) away from the radar (measured from the center of the antenna dome to the center of the radar).

The best placement for the TracVision antenna is above the radar. However, if there will be a significant horizontal separation between the radar and TracVision dome (i.e., at least 8 to 10 feet (2.4 to 3 meters)), the TracVision antenna can be placed below the radar as there will be little chance of signal blockage.

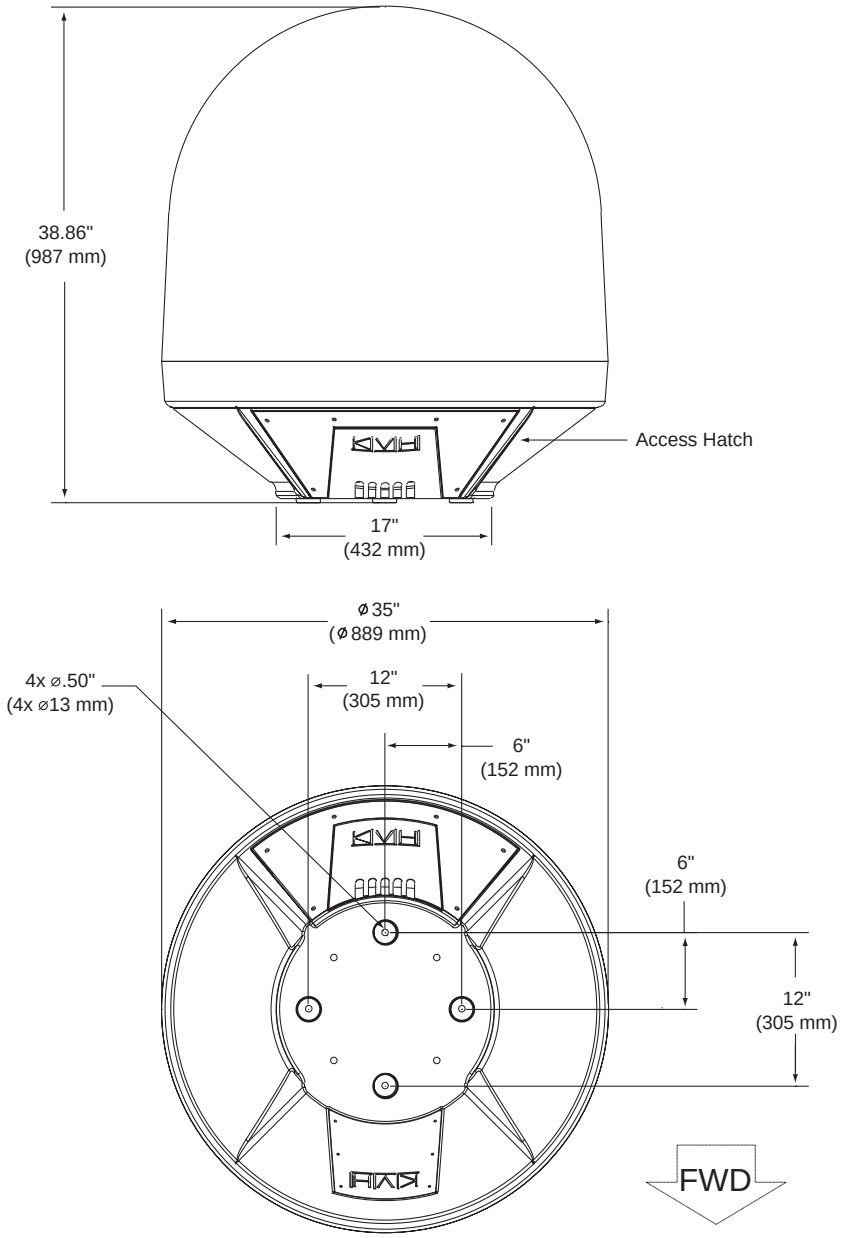


Figure 2-2
Antenna Unit Dimensions

The radome exterior is treated with a special finish selected for compatibility with the dome material and transparency to the satellite signals. Application of additional paints or finishes WILL degrade performance, potentially beyond acceptable limits.

A full-size template of the baseplate mounting holes has been provided at the back of this manual.

Four small holes have been drilled into the bottom of the baseplate to ensure that any moisture that enters the antenna unit is able to drain. Be sure these drain holes do not become blocked.

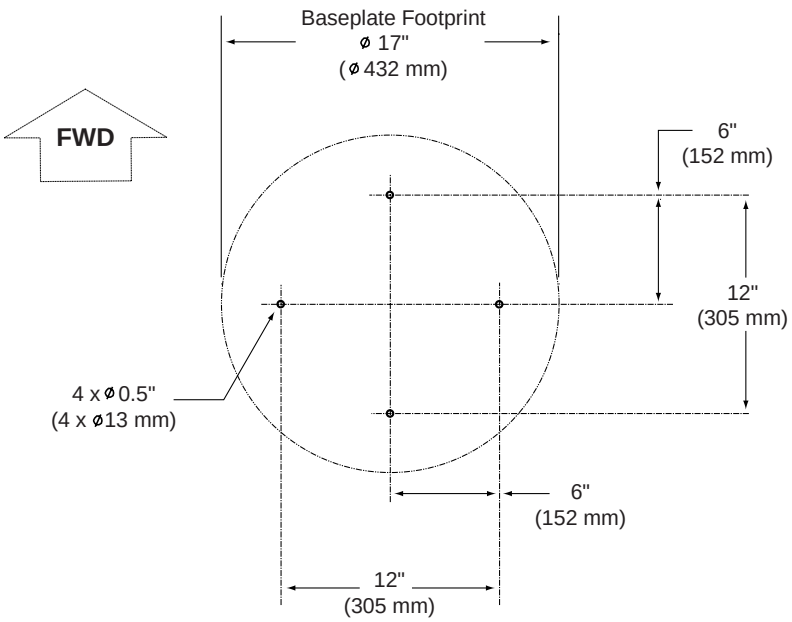
Choosing the Best Location for the MCU

- The MCU should be mounted in a dry location, allowing enough room at the back for connecting system cables.
- The MCU should be placed so that the LCD display is visible and the buttons are accessible to the user.
- The MCU is not susceptible to magnetic interference and does not need to be mounted on a level surface.

2.2 Mounting the TracVision Antenna

1. Make sure that you have chosen a suitable mounting location based upon the guidelines in *"Choosing the Best Location for the TracVision Antenna" on page 23*.
2. Using the template provided at the back of this manual or the dimensions shown in Figure 2-3, lay out the four mounting bolt holes. Make certain that the "Forward" arrow is parallel with the vessel's centerline and pointed toward the bow.

Figure 2-3
Antenna Mounting Holes Layout



A full-size template of the baseplate mounting holes has been provided at the back of this manual.

3. Drill the four ½" (13 mm) bolt holes following the layout in Step 2.
4. ***If mounting the antenna on a deck:***
   Mark a location aft of the antenna for the cable access hole. The hole must be large enough to accommodate the data/power cable and all required RF cables *(see Table 2-1 on page 21 to determine the number of RF cables required)*. Cut out the access hole and smooth the edges of the hole to protect the cables.
5. Remove the antenna unit from its shipping carton.

6. Remove the eight screws securing the radome to the baseplate. Carefully lift the radome straight up until clear of the antenna assembly and set it aside in a safe place. *If you bring the radome topside, secure it with a lanyard to prevent it from falling overboard.*

7. Remove the tie-wrap securing the MCU/kitpack box to the antenna baseplate. Remove the box.

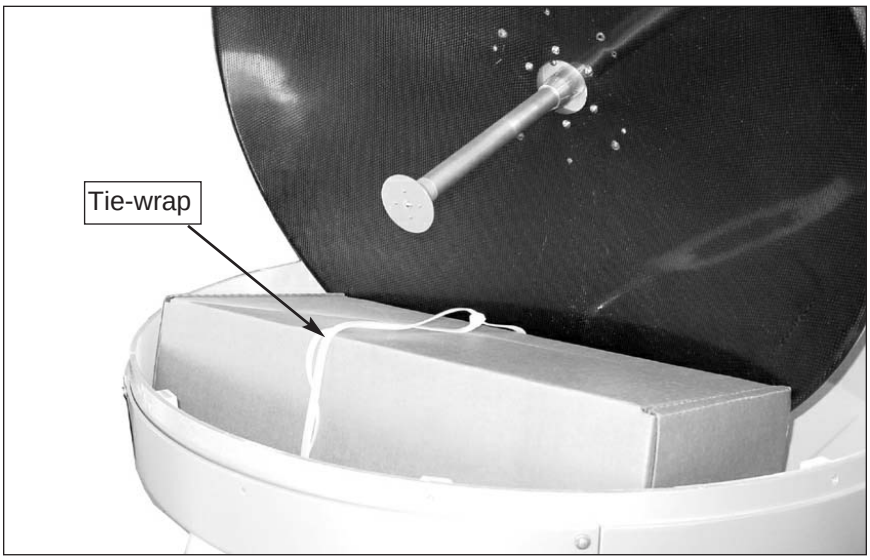


Figure 2-4
MCU/Kitpack Box

8. Unfasten the tie-wrap securing the antenna frame to the sensor bracket *(release the tab using a flat-head screwdriver)*. Save the tie-wrap in case the antenna needs to be reshipped someday.

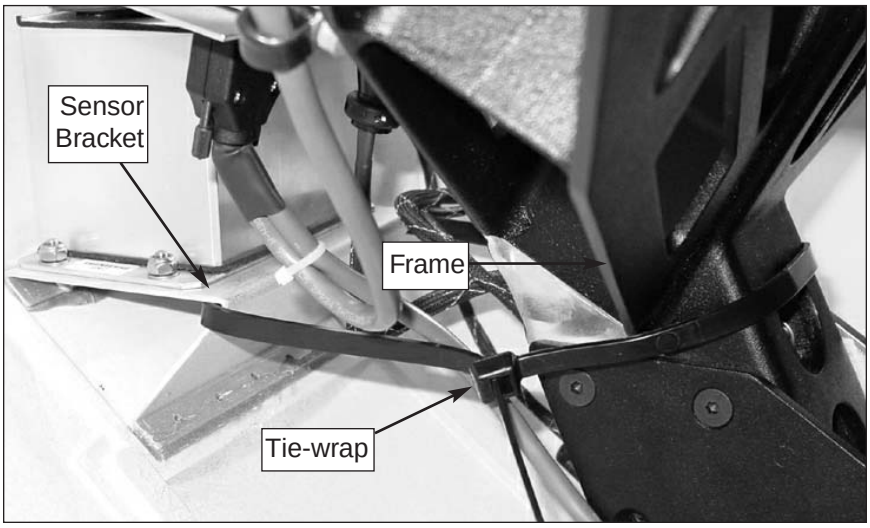


Figure 2-5
Antenna Frame Shipping Restraint

9. Inspect the antenna unit for any signs of shipping damage.

10. Position the baseplate assembly in place over the mounting holes, with the baseplate's connectors (shown in Figure 2-6) facing the stern. Ensure that all mounting holes line up and make any necessary adjustments.

Figure 2-6
Location of Baseplate Connectors

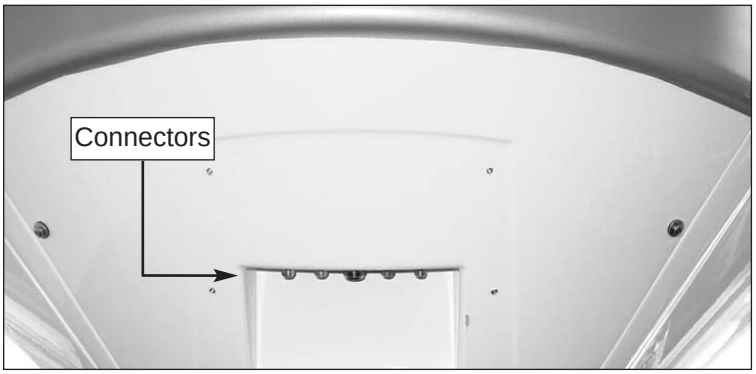
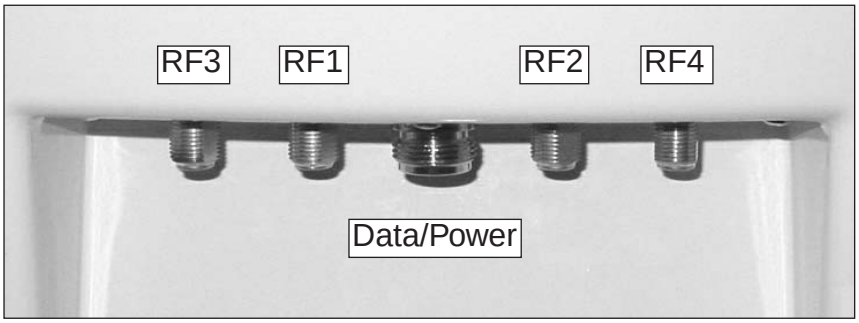


Figure 2-7
Baseplate Connectors



11. Connect the N-type connector end of the data/power cable (from belowdecks) to the baseplate, as shown in Figures 2-8 and 2-9.

Figure 2-8
Data/power Cable Connectors

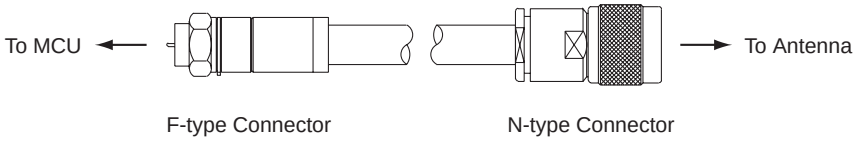


Figure 2-9
Connecting the Data/Power Cable

Be sure to properly align the data/power cable with the baseplate connector before tightening. Connecting the cable at an angle may damage the cable's center tines.

12. Using a 7/16" wrench, connect the RF cable(s) from belowdecks to the baseplate. If you connect more than one RF cable, label both ends of each RF cable to match its antenna baseplate connector (RF1, RF2, RF3, or RF4). Figure 2-10 shows an RF cable connected to the RF1 connector.

Do NOT use teflon gel on the cable fittings as it reduces signal strength at higher frequencies.

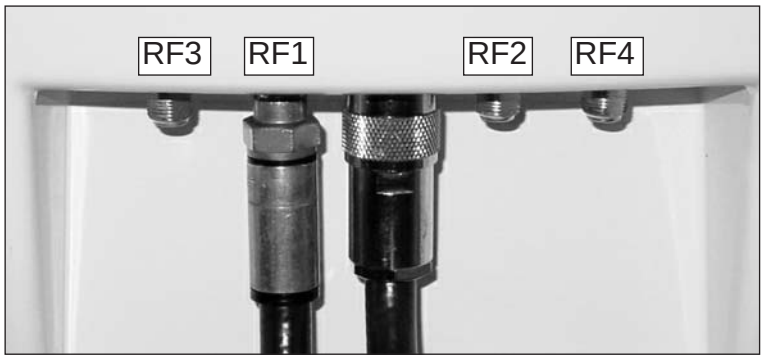


Figure 2-10
Connecting the RF1 Cable

13. Route the other ends of the data/power and RF cables belowdecks (if mounting the antenna to the deck, route the cables into the cable access hole that you cut out in Step 4).

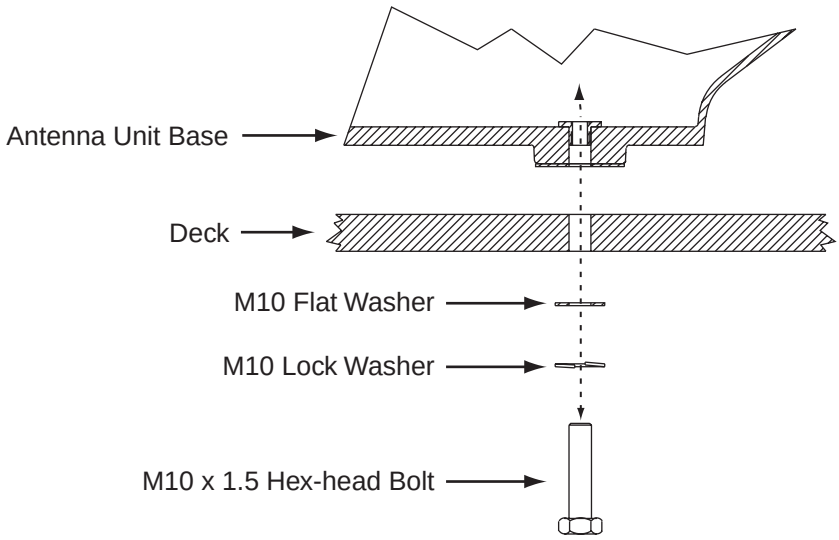
14. Place the rear logo plate over the cables, so that each cable exits the proper opening (see Figure 2-11). Using the six M4 screws supplied in the kitpack, attach the logo plate to the baseplate as shown in Figure 2-11.

Figure 2-11
Attaching the Logo Plate

15. Place the antenna baseplate over the mounting holes drilled in the foundation, ensuring the connectors face the stern.

16. At each of the four baseplate mounting holes, place an M10 lock washer and flat washer on an M10 bolt and insert the bolt into the hole from below, as shown in Figure 2-12. Tighten all four bolts securely until the four feet are bottomed against the mounting surface.

Figure 2-12
Bolting the Antenna Unit to the Deck (Side View)



17. Reinstall the radome. Secure in place with the eight screws removed in Step 6. Install a protective plastic screw cap from the kitpack over each screw.

2.3 Connecting the IRD(s)

Connecting the RF Cable(s)

Each RF cable must be an RG-11 (75 ohms) cable fitted with F-type connectors. The RF cables should already be connected to the antenna baseplate (see Step 12 of *Section 2.2, "Mounting the TracVision Antenna," on page 29*). The following sections explain how to connect the RF cable(s) to your satellite TV receiver(s) (IRDs).

For instructions on RF wiring for TracNet, please refer to the TracNet Owner's Manual *or* Technical Manual.

To connect the TracVision antenna to your IRDs, choose one of the following configurations (based on the number of IRDs you will connect to the antenna):

Option 1 - Connecting One IRD

Option 2 - Connecting Two IRDs

Option 3 - Connecting Three or More IRDs

Option 1 - Connecting One IRD

One end of the RF cable should already be connected to the RF1 plug on the base of the TracVision antenna. Connect the other end of the RF1 cable to the IRD plug labeled "LNB," "ANT/SAT," or "SATELLITE IN."

Option 2 - Connecting Two IRDs

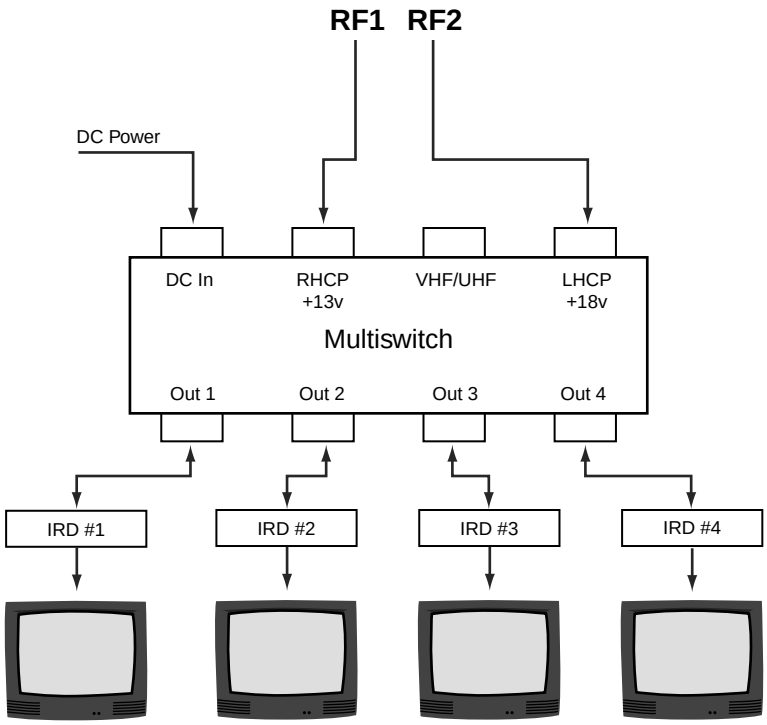
Two RF cables should already be connected to the RF1 and RF2 plugs on the base of the TracVision antenna. Connect the other ends of these RF cables to the plug labeled "LNB," "ANT/SAT," or "SATELLITE IN" on two IRDs.

The IRD that is connected to the "RF1" cable controls which satellite the antenna is tracking. The IRD connected to "RF2" can select different channels on that satellite but not change the satellite selection itself.

Option 3 - Connecting Three or More IRDs *(North American and Latin American Systems)*

To connect three or four IRDs to the TracVision antenna, you will need to install an active multiswitch (Channel Master model 6214IFD or equivalent) between the antenna and the IRDs. Two RF cables should already be connected to the RF1 and RF2 plugs on the base of the TracVision antenna. Figure 2-13 shows a typical wiring arrangement for three or four IRDs. Mount the multiswitch unit in accordance with the manufacturer's instruction sheet.

Figure 2-13
Single Multiswitch Installation (North American and Latin American Systems)



The use of an active multiswitch will interfere with the 22 KHz tone sent by DIRECTV DSS Plus™ IRDs to the antenna. As a result, the antenna will not receive the signal to change satellites when you change channels using your DIRECTV DSS Plus remote.

1. Connect the RF cable labeled "RF1" to the multiswitch input labeled "LNB RHCP +13V."
2. Connect the RF cable labeled "RF2" to the multiswitch input labeled "LNB LHCP +18V."
3. Connect the multiswitch outputs to individual IRD inputs. Use RG-11 cable with F-type connectors for all RF connections. Terminate all unused output connectors with 75 ohm DC blocks (Channel Master #7184, Radio Shack #15-1259 or equivalent).

Multiple Multiswitch Installation

If you need to connect more than four IRDs to the TracVision antenna, you may carry out a multiple multiswitch installation, as shown in Figure 2-14.

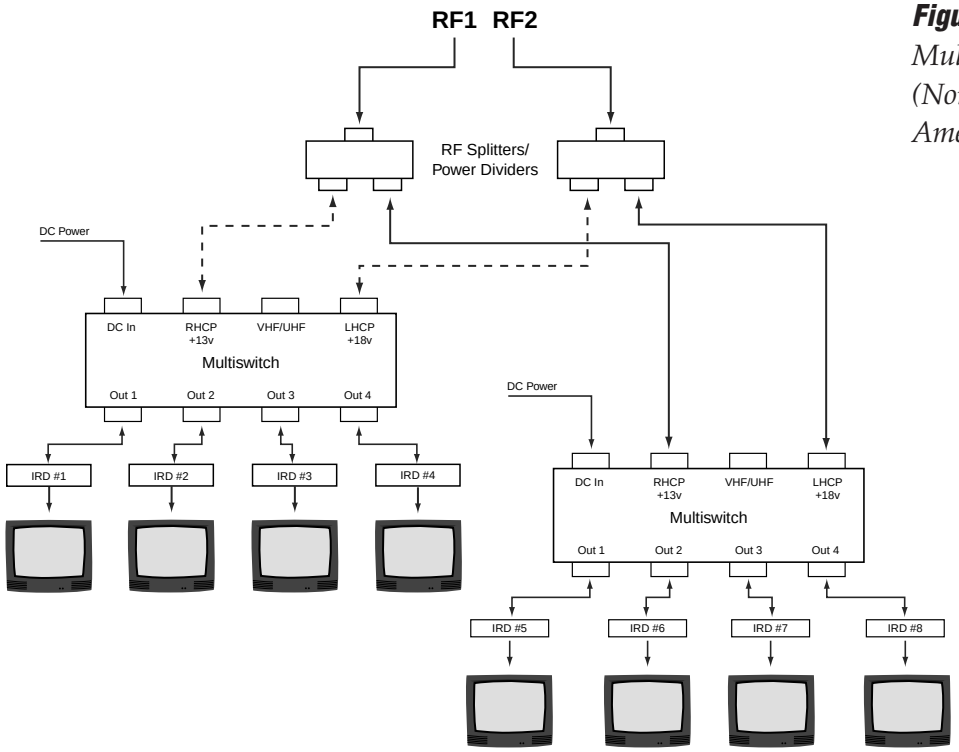


Figure 2-14
Multiple Multiswitch Installation (North American and Latin American Systems)

Option 3 - Connecting Three or More IRDs *(European Systems)*

Because the European system comes with a quad-output LNB, all four RF outputs from the TracVision antenna can be connected to individual IRDs.

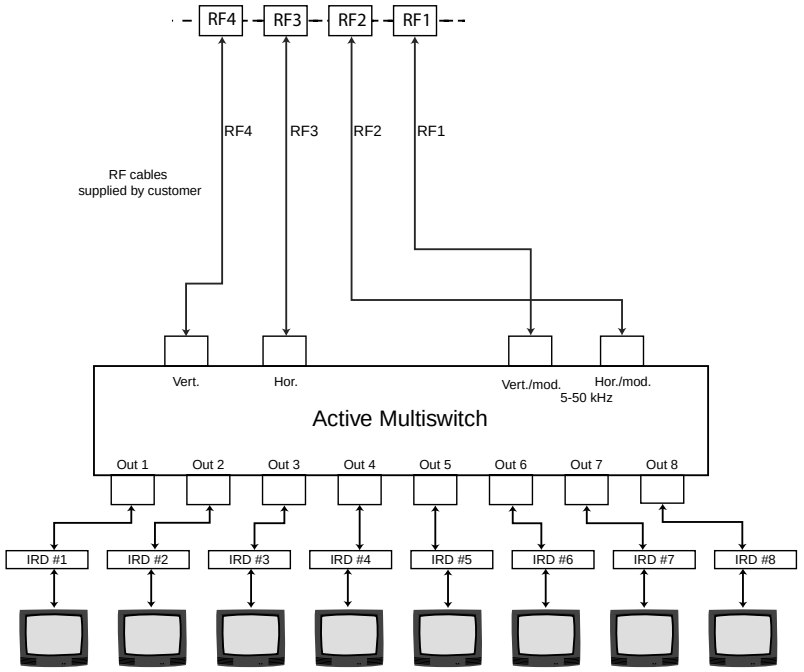
Connecting Three or Four IRDs

To connect a third IRD, a third RF cable should already be connected to the RF3 plug on the base of the TracVision antenna. Connect the other end of the RF3 cable to the plug labeled "LNB," "ANT/SAT," or "SATELLITE IN" on the third IRD. To connect a fourth IRD, use the fourth RF cable, which should already be connected to the RF4 plug on the base of the antenna.

Connecting More than Four IRDs

To connect more than four IRDs, you will need to install an active multiswitch between the antenna and the IRDs. Connect the multiswitch unit in accordance with the manufacturer's instructions. Figure 2-15 shows an example of a European multiswitch configuration.

Figure 2-15
Multiswitch Installation (European Systems)



Connecting the IRD Ground Wire

A grounding wire has been provided to connect your IRD to a suitable ground. Attach the grounding wire to any suitable screw on the rear panel of the IRD with a good contact with the IRD chassis. The other end should be connected to a suitable ground, ideally to the MCU ground terminal *(route the ground wire to the MCU and leave unconnected for now).* **Each IRD that you connect to the TracVision system should have a similar ground connection.**

Be sure to connect a ground cable from each IRD to a suitable ground, ideally the MCU ground terminal.

If you are using a multiswitch, you can ground the multiswitch instead of the individual IRDs.

2.4 Wiring the MCU

All other wiring for the TracVision system connects at the rear panel of the MCU.

For the TracVision system to work, you must connect the following cables to the MCU:

- Antenna data/power cable
- Vessel power cable
- IRD ground cable(s)

Figure 2-16 shows the MCU's rear panel connectors. Refer to this figure when wiring components to the MCU.

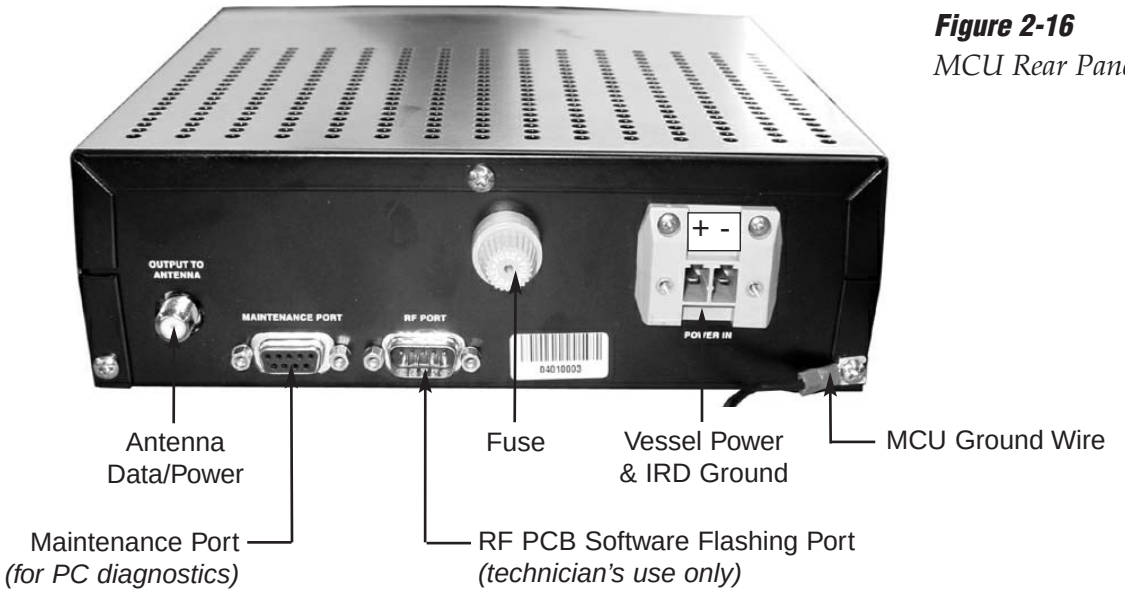


Figure 2-16
MCU Rear Panel

Connecting the Antenna Data/Power Cable

Connect the antenna data/power cable to the data/power connector on the MCU's rear panel (see Figure 2-16). Do not overtighten; finger-tight is sufficient.

Connecting Vessel Power and the IRD Ground Wire

Before connecting the power cable, turn off vessel power and test the circuit to ensure that no power is present.

Short circuits may result in severe electrical shock or burns. Turn off vessel power and test the circuit to ensure that no power is present before connecting any power cables. **Do NOT reapply power until all system wiring is completed.**

KVH recommends a 24 VDC power input to the TracVision G8 (supplying not less than 9 VDC at the MCU). Power supplied to the TracVision G8 ***MUST NOT*** *exceed 36 VDC or the TracVision power supply will suffer serious damage!*

The TracVision G8 system requires an 9-36 VDC power input. Since it does not have a dedicated power control (ON/OFF switch), a quick-tripping circuit breaker or fuse should be installed between vessel power and the MCU. Circuit overload protection should be rated for 30 amperes. For recommended power cable specifications, refer to Table 2-2 on page 22.

A power connector plug has been supplied in the kitpack to make connecting power to the MCU a snap. To connect the power and IRD ground wires, follow the simple steps below.

1. A large ferrite coil is supplied in the kitpack to help reduce conducted emissions from the vessel power cable. This ferrite coil needs to be installed for the system to comply with CE standards. To install the ferrite coil, make two loops in the vessel power cable and clamp the ferrite coil around the loops (see Figure 2-17). The cable, with both positive and negative wires, must pass through the ferrite coil three times to be effective.

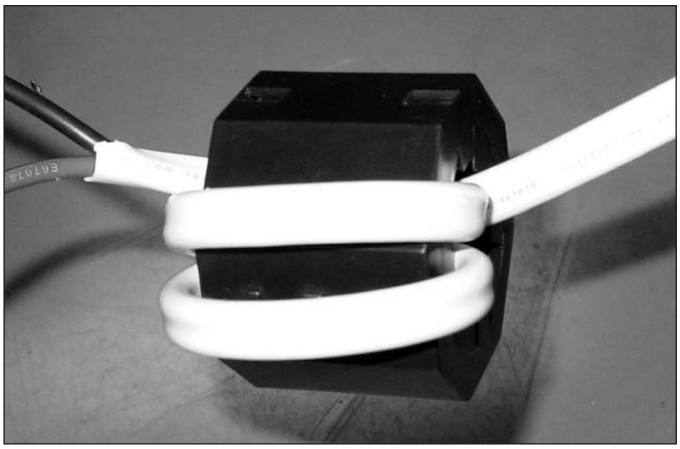


Figure 2-17
Large Ferrite Coil Clamped onto Vessel Power Cable

2. Find the power plug provided in the kitpack and insert your vessel power wires into the plug's (+) and (-) terminals (see Figure 2-18).
3. If you've routed an IRD ground wire to the MCU (as recommended in *Connecting the IRD Ground Wire on page 35*), insert the wire into the plug's ground (-) terminal.
4. Secure the wires in place by tightening the terminal screws.
5. After inserting and securing the wires, tug gently to ensure that the connections are solid. Also make certain that the wire insulation is not pinched in the connector.
6. Plug the power connector plug into the power jack on the MCU's rear panel (see Figure 2-16 on page 35).
7. Secure the plug in place with the two retaining screws.
8. The MCU has a ground wire preattached to one of its retaining screws (see Figure 2-19). Be sure to connect this wire to a suitable ground.

Figure 2-18
Power Plug

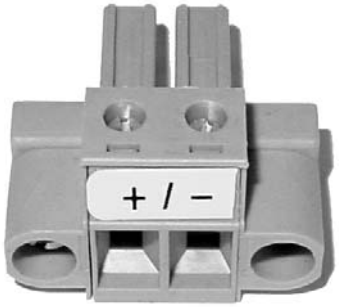


Figure 2-19
MCU Ground Wire

2.5 Mounting the MCU

Mount the MCU using either of the following options:

Option 1 - Velcro Fastening on a Horizontal Surface

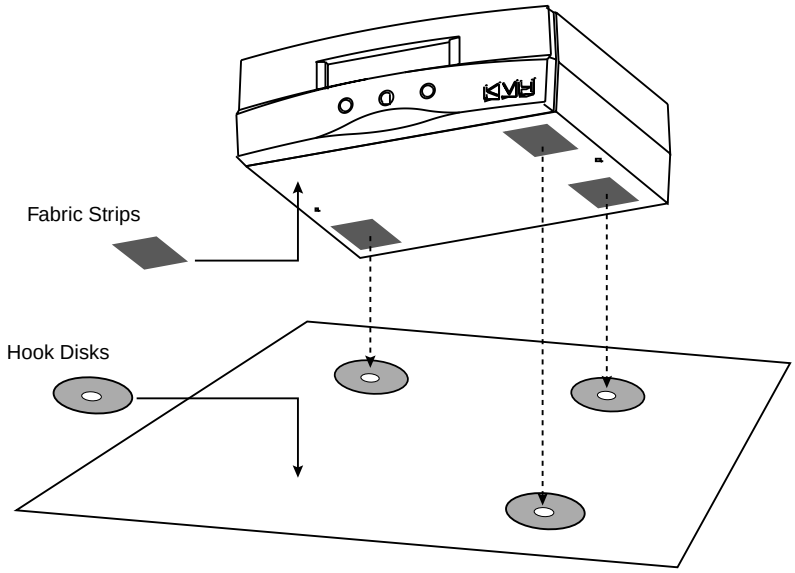
Option 2 - Flush-mounting

The following sections describe how to mount the sensor for both of these options.

Option 1 - Velcro Fastening on a Horizontal Surface

1. Choose a location based upon the guidelines in *"Choosing the Best Location for the MCU" on page 25.*
2. Remove the four squares of Velcro fabric from the kitpack. Clean the bottom of the housing with a mild detergent and water to remove oils, etc. Peel the protective backing from the squares and apply them to the bottom of the housing at each of the four corners (see Figure 2-20).

Figure 2-20
Mounting the MCU with Velcro Attachments



3. Position the four Velcro hook disks where the MCU will be mounted. Drill screw holes for the disks and secure in place with the #4-24 screws supplied in the kitpack.
4. Press the MCU firmly into place so that the loop material engages the hook disks.

Option 2 - Flush-mounting

1. Choose a location based upon the guidelines in *"Choosing the Best Location for the MCU" on page 25.*
2. A template has been provided in *Appendix B on page 129* as a guide to mark and cut the proper hole for the flush mount bracket. Cut the hole and make certain the bracket and MCU will fit easily.
3. At the two holes in the bottom of the MCU, place a #6 flat washer on a #6-32 screw and insert the screw into the hole from below, as shown in Figure 2-21. Do not tighten the screws yet; just a few turns is sufficient.

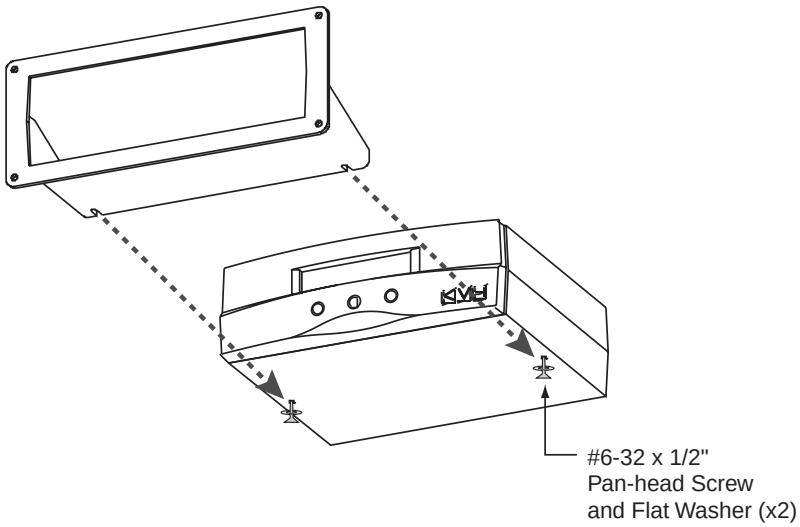


Figure 2-21
Securing the MCU to the Flush Mount Bracket

4. Slide the flush mount bracket backward over the MCU until the two notches meet the screws as shown in Figure 2-21.
5. Tighten the screws to secure the MCU to the bracket.
6. Insert the MCU and bracket into the hole and secure the unit to the mounting surface with the #8 (black) screws and #8 washers supplied in the kitpack.

2.6 Activating/Programming the IRD

Before it can be used, your IRD must be activated and/or programmed, as described below.

DIRECTV and DISH Network IRD Activation

KVH makes it easy to activate your DIRECTV or EchoStar (DISH Network) IRD. Just call KVH at 1-888-584-4163 and ask for **IRD Activation** (Monday - Friday, 8:30 a.m. - 5:00 p.m. EST). For other options, please refer to the user manual that accompanied your IRD.

Other IRD Activations

Please refer to the user manual that accompanied your IRD for activation instructions.

Programming European IRDs

Before the TracVision G8 system can be used in Europe, the IRD must be programmed to receive signals from the selected DVB satellite services. Programming is conducted using menu selections displayed on the TV screen. Please refer to your IRD owner's manual for specific instructions.

Table 2-4 provides some key data for use when programming the IRD.

Table 2-4
Key IRD Settings

Configuration Item	Setting
Antenna Alternative 1	DiSEqC 1
Antenna Alternative 2	DiSEqC 2
LNB Frequency	Universal

When programming the IRD with the antenna configuration data, make certain that your choices for Antenna Alternatives 1 and 2 match those installed as Satellites A and B during the Install Satellite procedure detailed in Section 2.7, "Installing Satellites Using the MCU," on page 42.

It is also important that the IRD's settings for Antenna Alternatives 1 and 2 match the MCU's installed satellite settings as follows:

- Antenna Alternative 1 = Satellite A
- Antenna Alternative 2 = Satellite B

Section 2.7, "Installing Satellites Using the MCU," on page 42 provides details on the satellite installation process.

Programming DSS Plus IRDs

If you are using multiple DSS Plus IRDs and intend to shift from one satellite to another, **only one** of the IRDs can be configured as a two-satellite receiver. All other IRDs must be configured as one-satellite receivers. The two-satellite IRD will determine which satellite the antenna is tracking while the other receivers can watch any channels available via that satellite. Refer to your IRD owner's manual for complete details on this process.

If you use an active multiswitch to connect three or more IRDs, the multiswitch will interfere with the 22 KHz tone sent by DIRECTV DSS Plus™ IRDs to the antenna. As a result, the antenna will not receive the signal to change satellites when you change channels using your DIRECTV DSS Plus remote.

2.7 Installing Satellites Using the MCU

The TracVision G8 can track a variety of DVB-compatible and DSS (DIRECTV) satellites. The system contains a preprogrammed library of North American, European, and Latin American satellites. It also has two open slots that you may use to program two additional satellites of your choice. Table 2-5 lists the possible satellite pairs in North America and Table 2-6 lists the satellites that can be programmed in Europe *(as long as the paired satellites are within range of the TracVision antenna)*. Two of these satellites may be selected to reside in the system's active memory as Satellites A and B. For Latin American systems, either Galaxy_8W or Galaxy_8E can be selected, but not both.

Table 2-5
Available Satellite Pairs – North America (North American LNB Required)

	DSS_101	DSS_119	Echo_61	Echo_110	Echo_119	Echo_148	Expressvu	ExpressTV
DSS_101		✓					✓	✓
DSS_119	✓						✓	✓
Echo_61				✓	✓		✓	✓
Echo_110			✓		✓	✓	✓	✓
Echo_119			✓	✓		✓	✓	✓
Echo_148				✓	✓		✓	✓
Expressvu	✓	✓	✓	✓	✓	✓		✓
ExpressTV	✓	✓	✓	✓	✓	✓	✓	

Table 2-6
Available Satellites – Europe (European LNB/Feed Tube Assembly Required)

Any two of the European satellites listed below can be paired together, as long as the satellites are within range of the antenna:

- Astra1
- Astra2N
- Astra2S
- Hispasat
- HotbirdWB
- Hotbird
- Sirius
- Thor
- Arabsat
- Nilesat
- Optus_B1
- Optus_B3

The satellites listed in TracVision G8's preprogrammed satellite library will be sufficient for most users. However, if you wish to install one or two satellites that are not in the library, skip to *"Programming User-defined Satellites" on page 45*. After configuring these user-defined satellites, return to the satellite installation process in *"Installing Your Selected Satellites" on page 43*.

Installing Your Selected Satellites

To install your selected satellites as Satellite A and Satellite B, follow the steps below.

1. Apply power to the MCU.
2. Following the startup sequence, press the center button to bring up the "Install Satellite?" screen.

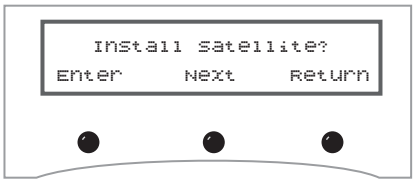
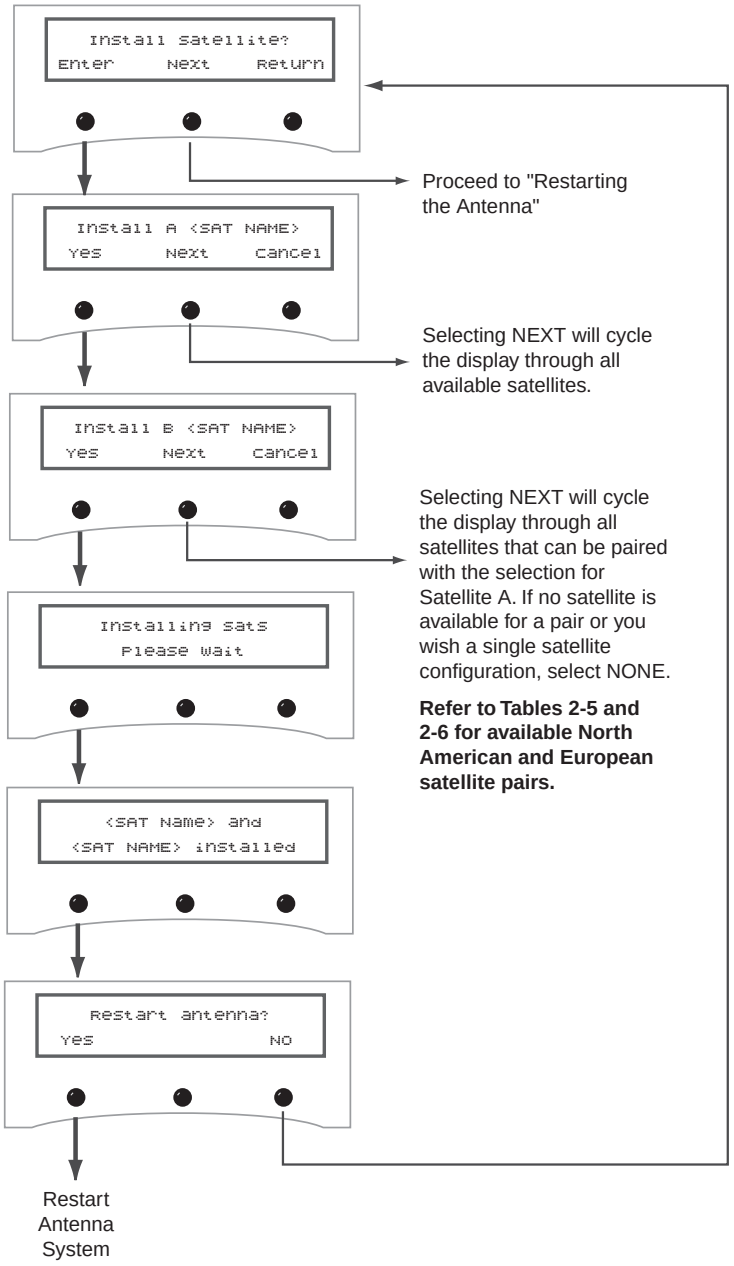


Figure 2-22
Install Satellite Screen

3. Follow the process shown in Figure 2-23 on the following page to install your selected satellites. At the end of the process, be sure to press the **YES** button to restart the antenna.

Section 3, "Using the MCU Interface," *provides complete details on the use of the MCU menus, including complete antenna control details in* "Control Antenna Mode" on page 68.

Figure 2-23
Install Satellite Pair Process


Install Satellite?
Enter Next Return
Proceed to "Restarting the Antenna"
Install A <SAT NAME>
Yes Next Cancel
Selecting NEXT will cycle the display through all available satellites.
Install B <SAT NAME>
Yes Next Cancel
Selecting NEXT will cycle the display through all satellites that can be paired with the selection for Satellite A. If no satellite is available for a pair or you wish a single satellite configuration, select NONE.
Refer to Tables 2-5 and 2-6 for available North American and European satellite pairs.
Installing Sats
Please Wait
<SAT Name> and
<SAT NAME> installed
Restart antenna?
Yes NO
Restart Antenna System

Programming User-defined Satellites

The TracVision G8 satellite library has the capacity for two user-defined satellites in case you want to track a satellite that is not currently preprogrammed in the library. User-defined satellites can only be configured via the MCU's maintenance port. To configure a user satellite, information about the satellite must be provided, including:

- Satellite name
- Satellite position (longitude)
- Transponder information for each of the following polarizations/frequencies:
  - vertical high
  - vertical low
  - horizontal high
  - horizontal low

  OR

  - right
  - left
- Transponder information includes:
  - frequency
  - symbol rate
  - FEC code
  - network ID (in hexadecimal format)

This information can be obtained from your satellite service provider or from a number of sites on the Internet, such as *www.satcodx.com*.

How to tell the difference between High and Low bands:

High: 11.700 - 12.750 GHz

Low: 10.700 - 11.700 GHz

For your reference, the satellite configuration information for the predefined satellites is available on our web site at www.kvh.com/footprint/index.html.

Connecting a PC to the MCU Maintenance Port

To program your user-defined satellites into the TracVision G8 satellite library, you need to connect a PC to the MCU's maintenance port. This procedure requires Windows Hyperterminal (or other terminal emulation software, such as PROCOMM). Use the settings appropriate to your application and follow the steps below.

1. Connect one end of the PC data cable to the DB9 maintenance port connector on the rear of the MCU. Connect the other end to the serial port on your PC (a 9-pin/25-pin connector adapter may be needed for some PCs).

Figure 2-24
MCU Maintenance Port

2. Open the terminal emulation software and establish the following settings:
   - 9600 baud
   - no parity
   - 8 data bits
   - 1 start bit
   - 1 stop bit
   - no flow control
3. Apply power to the TracVision G8 system and allow the system to complete full initialization. Data should be scrolling on the PC display to identify any system problems detected. If no data is seen, recheck your connections and the terminal software setup for the correct COM port.

Entering User-defined Satellite Data

To configure your user-defined satellites, follow the steps below.

1. Using your PC's terminal emulation program, enter the SATCONFIG parser command as follows:

Table 2-7 *SATCONFIG Parser Command*

Command:	**SATCONFIG,USERX,YYY,Z,D,L<cr>** *(<cr> indicates a carriage return/ENTER key)*
Where:	X = 1 or 2 (satellite alternative) YYY = longitude (0-180) Z = E (East) or W (West) D = decoding type (0 = test, 1 = DSS-A, 2 = DSS-B, 3 = DVB) L = LNB polarization (C = circular, L = linear)
Function:	configures one of the user-configurable satellites with the longitude provided
Response:	if valid entry, echoes the input data if invalid entry, returns error message

2. Type **@DEBUGON<cr>** to enter DEBUG mode.
3. Enter the satellite's transponder information as follows:

Table 2-8 *Satellite Transponder Data Sequence*

Command:	**@SATCONFIG,X,N,F,S,C,ID,P,B,D<cr>**
Where:	@SATCONFIG = directs data to the RF Board X = satellite location A or B N = satellite table # (98 & 99 are slots for user-defined satellites) F = frequency in MHz (either 00000 or a range from 10700 - 12700) S = the satellite transponder symbol rate in Mbit/second (01000 - 29999) C = the FEC code (e.g., 12, 23, 34, 56, 67, 78) ID = the satellite network ID in hexidecimal format (0x####) P = the LNB polarization (v = vertical, h = horizontal, r = right, l = left) B = the LNB down conversion frequency (l = low, h = high, G = Latin America, U = USA) D = decoding type (0 = test, 1 = DSS-A, 2 = DSS-B, 3 = DVB)

4. Repeat Step 3 for each of the following transponder categories:

   - vertical high
   - vertical low
   - horizontal high
   - horizontal low

   OR

   - right
   - left

   TracVision G8 requires that the data fields for all transponder categories be provided. If the selected satellite does not have information for one or more of the transponder categories, default information should be entered in the fields as follows:

Table 2-9
Satellite Transponder Default Data

Transponder Data	Default Value
Frequency	00000
Symbol Rate	27500
FEC Code	the same value as provided for those transponders with data
Network ID	0x0000
Polarity and Band	whichever combinations are not already provided

5. After entering all of the necessary information, save the settings by typing **@SAVE,A<cr>** (or **B** if the data is for satellite User 2).
6. Type **ZAP<cr>** to restart the antenna.
7. If you need to configure a second user-defined satellite, repeat this procedure starting with Step 1 to enter data for the USER2 satellite.

You have now added your user-defined satellite(s) to the system's satellite library. The first user-defined satellite you configured is stored as USER1. If you configured a second satellite, it is stored as USER2.

If you want the antenna to track one or both of these user-defined satellites, you need to install it. To install a satellite, you can use either the MCU, as described in *"Installing Your Selected Satellites" on page 43*, or you can use the SATINSTALL command, as described on the following page.

1. Type **HALT<cr>** to put the antenna in Idle mode.
2. Enter the **SATINSTALL** parser command as follows:

Command:	**SATINSTALL,<sat_a_name><sat_b_name><cr>**
Where:	<sat_a_name> = the name of your choice for Satellite A (for example: USER1) <sat_b_name> = the name of your choice for Satellite B (for example: USER2)

   If you only want to install and track one satellite, enter **NONE** as the name of Satellite B.

3. Once you've assigned satellites as Satellite A and Satellite B, you need to tell the antenna which of the two satellites it should initially acquire and track. This step should be performed the first time a satellite is selected, allowing the system to download the channel guide. To do so, enter the following parser command:

Command:	**@L,x<cr>**
Where:	x = A or B (whichever satellite you want to track)

4. Type **ZAP<cr>** to restart the antenna.

Examples of the user-defined satellite configuration process are provided for reference in the next two sections.

European systems only:
If DiSEqC is active on your IRD, once the antenna restarts, the antenna starts tracking the satellite currently selected by the IRD, overriding the @L,x command.

An Example of Configuring a User-defined Satellite (N. America)

The following is an example of configuring the fictional YOURSAT 101 as the USER1 configured satellite. Prior to configuring this satellite or any others, be certain to get the most up-to-date information from one of the sources previously discussed.

Table 2-10
Sample Satellite Configuration Data (North America)

YOURSAT 101 at 122 West, DVB Decoder, Circular Polarization LNB

Right	
Frequency	12.225 GHz
Symbol Rate	20000
FEC Code	5/6
Network ID	4100(dec) = 0x1004
Left	
Frequency	12.456 GHz
Symbol Rate	20000
FEC Code	5/6
Network ID	4100(dec) = 0x1004

Based on this information, the data entered via the PC would look like this, assuming that YOURSAT 101 would be Satellite A:

```
SATCONFIG,USER1,122,W,3,C
@DEBUGON
@SATCONFIG,A,98,12225,20000,56,0x1004,R,U,3
@SATCONFIG,A,98,12456,20000,56,0x1004,L,U,3
@SAVE,A
ZAP
```

To install and start tracking the USER1 satellite, the following additional data would be entered:

```
HALT
SATINSTALL USER1,NONE
@L,A
ZAP
```

An Example of Configuring a User-defined Satellite (Europe)

The following is an example of configuring the fictional YOURSAT 101 as the USER1 configured satellite. Prior to configuring this satellite or any others, be certain to get the most up-to-date information from one of the sources previously discussed.

Table 2-11
Sample Satellite Configuration Data (Europe)

Yoursat 101 at 7 West, DVB Decoder, Linear Polarization LNB

Horizontal High	
Frequency	11.966 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048 (dec) = 0x0800
Vertical High	
Frequency	11.823 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048(dec) = 0x0800
Vertical Low	
No Data Listed	
Horizontal Low	
No Data Listed	

Based on this information, the data entered via the PC would look like this, assuming that YOURSAT 101 would be Satellite A:

```
SATCONFIG,USER1,7,W,3,L
@DEBUGON
@SATCONFIG,A,98,11966,27500,34,0x0800,H,H,3
@SATCONFIG,A,98,11823,27500,34,0x0800,V,H,3
@SATCONFIG,A,98,00000,27500,34,0x0000,V,L,3
@SATCONFIG,A,98,00000,27500,34,0x0000,H,L,3
@SAVE,A
ZAP
```

To install and start tracking the USER1 satellite, the following additional data would be entered:

```
HALT
SATINSTALL USER1,NONE
@L,A
ZAP
```

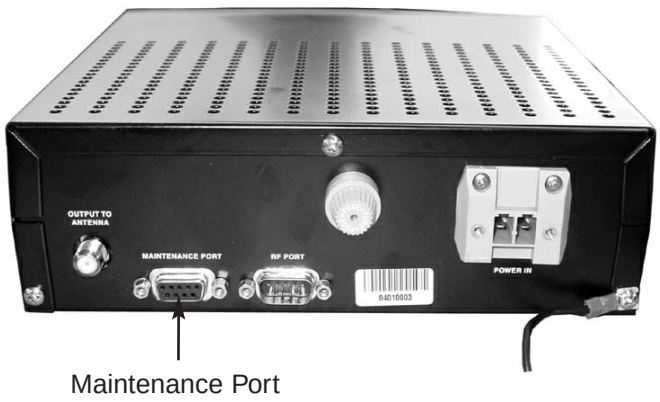
2.8 Checking Out the System

Now that you've installed the TracVision G8, you need to verify that the system functions properly. Check the system startup routine to ensure that the system is operating within normal parameters.

To view the startup routine, connect a PC to the MCU's maintenance port. This procedure requires Windows Hyperterminal (or other terminal emulation software, such as PROCOMM). Use the settings appropriate to your application.

1. Connect one end of the PC data cable to the DB9 maintenance port connector on the rear of the MCU. Connect the other end to the serial port on the PC (a 9-pin/25-pin connector adapter may be needed for some PCs).

Figure 2-25
MCU Maintenance Port



2. Open the terminal emulation software and establish the following settings:
   - 9600 baud
   - no parity
   - 8 data bits
   - 1 start bit
   - 1 stop bit
   - no flow control
3. Apply power to the TracVision G8 system and allow the system to complete full initialization. Data should be scrolling on the PC display to identify any system problems detected. If no data is seen, recheck your connections and the terminal software setup.

4. After completing the review of the startup and operational routines, turn on the IRD and television and check the channels on the selected satellites. For European systems, check both horizontally and vertically polarized channels, if possible.
5. When all checks are completed, shut down the system.

A sample startup sequence has been provided in Appendix D on page 133 *with the typical ranges and responses for the TracVision G8 during startup and operation.*

Be certain to fill out and submit the warranty card to KVH to ensure that your TracVision G8 is fully covered under the 2-year parts and 1-year labor warranty.

2.9 Changing Geographic Location

If you move to a different geographic area, you will need to modify your TracVision G8 system to receive satellite TV signals in the new location. To begin receiving satellite signals in the new area, perform the following steps.

Swap LNB/Feed Tube Assembly

To receive the proper satellite signals in the new geographic location, your TracVision antenna must be equipped with the appropriate LNB/feed tube assembly for that location:

Table 2-12
Required LNB or LNB/Feed Tube Assembly for New Geographic Location

Moving from:	Moving to:	Order from KVH:
North America	Latin America	Latin American LNB
North America Latin America	Europe	European LNB/feed tube
Latin America	North America	North American LNB
Europe	North America	North American LNB/feed tube
Europe	Latin America	Latin American LNB/feed tube

Table 2-13 lists the part numbers for ordering these various options.

Table 2-13
LNB and LNB/Feed Tube Assembly Part Numbers

Part Name	Part Number
North American LNB	02-0870
North American LNB/feed tube assembly	02-1282-01
Latin American LNB	02-0870-01
Latin American LNB/feed tube assembly	02-1282-03
European LNB/feed tube assembly*	02-1282-04

** The European LNB/feed tube assembly includes a skew control mechanism that allows the antenna to automatically adjust skew for changes in region and satellite service.*

Install New Satellites

When you move to a new area, the list of available satellites changes. If you're moving to Europe, you will need to choose a new satellite pair from the list of available European satellites (see Table 2-6 on page 42). If you're moving to the U.S., you will need to choose a new satellite pair from the list of available North American satellites (see Table 2-5 on page 42). And if you're moving to Latin America, you will need to select the Latin American satellite. For details on installing these new satellites, refer to *Section 2.7, "Installing Satellites Using the MCU," on page 42*.

Replace the IRD

In order to receive satellite TV service in your new geographic location, you will need to purchase an IRD designed for that location. Refer to your satellite TV service provider for more information.

You may also need to replace your television when changing geographic location. In North America, your TV must support the NTSC video standard. In Europe, your TV must support the PAL video standard.

3 — Using the MCU Interface

This section explains how to use all of the MCU functions. You will use the MCU to operate, control, and monitor the TracVision G8.

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3.2 Main Display and Accessing the Main Menu 60

3.3 Installing Satellites 63

3.4 Restarting the Antenna 65

3.5 Operations Mode 65

3.1 Startup and Self-test

To turn on the TracVision G8, follow the steps below.

1. Turn on the IRD and television.
2. Apply operating power to the MCU.
3. Wait while the system initializes and searches for the satellite.

The MCU displays the following screens during system startup:

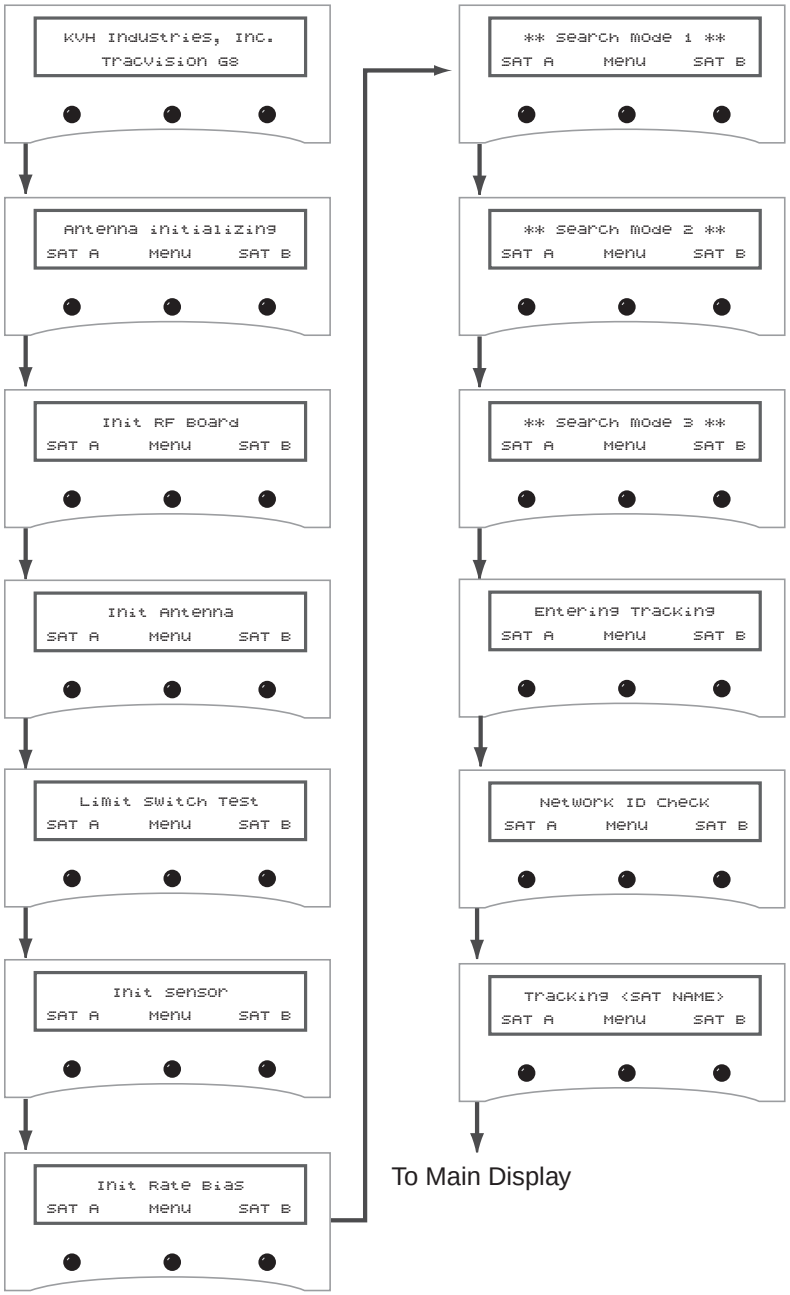


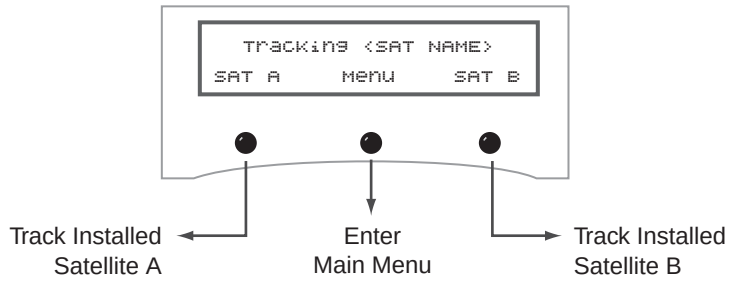
Figure 3-1
TracVision G8 Startup Screens

"Search Mode" screens may not appear during every startup.

3.2 Main Display and Accessing the Main Menu

As soon as the startup routine is completed, the LCD panel shows the main display, which shows which satellite the antenna is currently tracking. The soft keys allow you to switch between the two installed satellites as well as enter the main menu. The key functions are as follows:

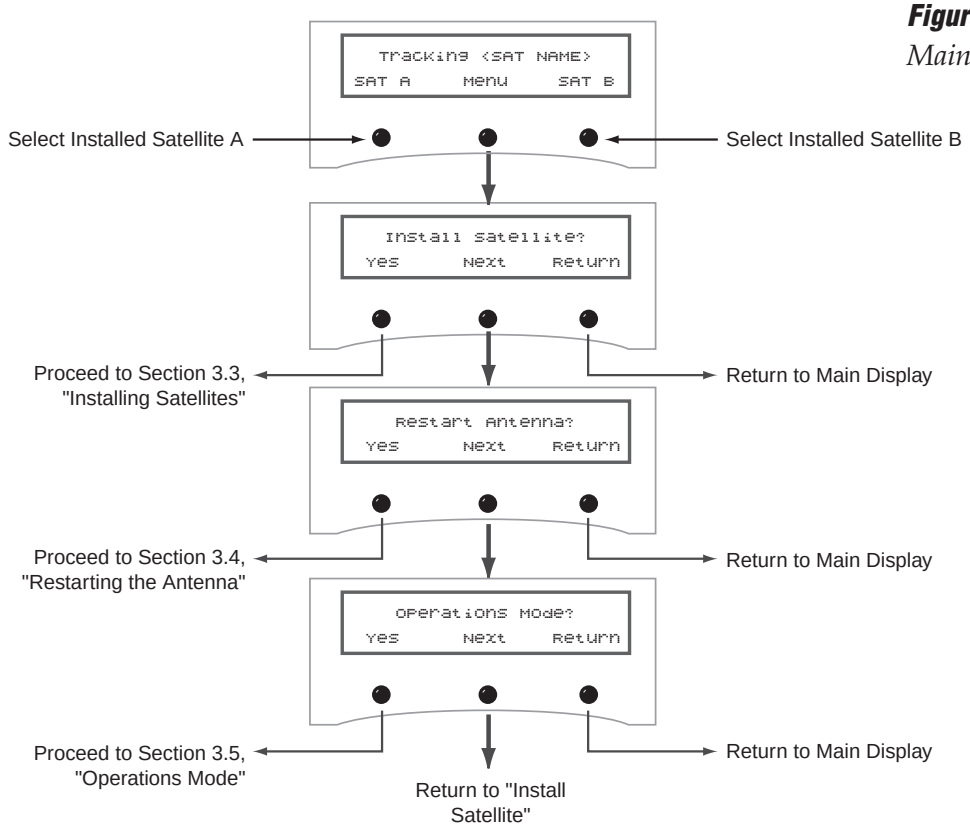
Figure 3-2
Main Display and Key Functions



Main Menu

Pressing the center key will cycle the main menu through the available functions as follows:

Figure 3-3
Main Menu Functions



The RETURN and CANCEL Keys

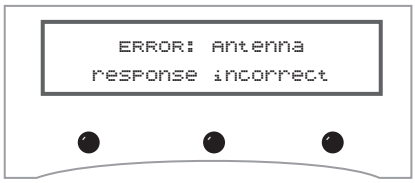
Throughout the menus, the right-hand key will often be designated as either RETURN or CANCEL. These options have the following functions:

- **RETURN** – Returns to the main menu or display. If no keys are pressed within 10 seconds, the menu will automatically default to the main display.
- **CANCEL** – Cancels the current action and returns to the start of the action without making any changes.

Antenna Error Messages

At times, the MCU will display error messages alerting you to a specific problem (e.g., you have selected an invalid satellite pair). There are also two general antenna error messages that are not related to a specific action.

Figure 3-4
Incorrect Response Error Message



"Antenna response incorrect" (shown in Figure 3-4) indicates that the MCU received an incorrect answer from the antenna in response to a request. The solution to this error is simply to repeat your requested operation.

Figure 3-5
Non-responsive Antenna Error Message

"Antenna not responding" (shown in Figure 3-5) indicates that no messages are being received from the antenna. This is usually the result of the antenna not being powered up or the antenna being disconnected from the MCU.

3.3 Installing Satellites

TracVision G8 permits two satellite services (Satellites A and B) to be installed simultaneously. There is also an option for **NONE** on Satellite B, permitting single satellite operation.

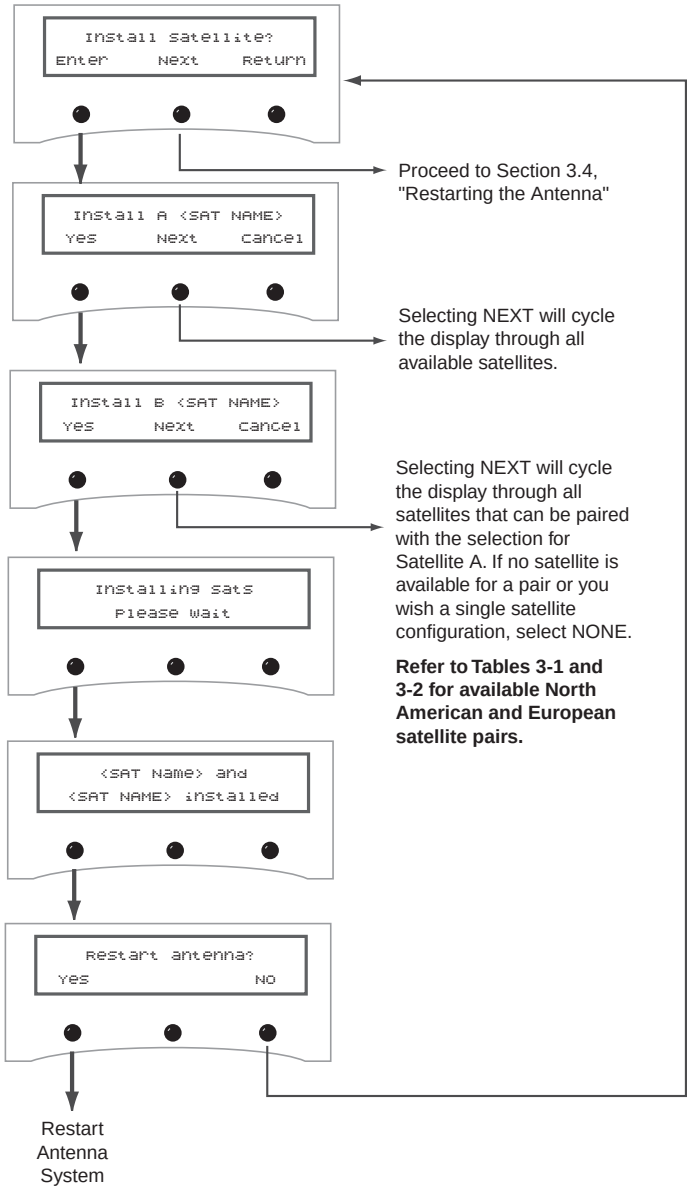

Install satellite?
Enter Next Return
Proceed to Section 3.4, "Restarting the Antenna"
Install A <SAT NAME>
Yes Next Cancel
Selecting NEXT will cycle the display through all available satellites.
Install B <SAT NAME>
Yes Next Cancel
Selecting NEXT will cycle the display through all satellites that can be paired with the selection for Satellite A. If no satellite is available for a pair or you wish a single satellite configuration, select NONE.
Refer to Tables 3-1 and 3-2 for available North American and European satellite pairs.
Installing Sats
Please Wait
<SAT Name> and
<SAT NAME> installed
Restart antenna?
Yes NO
Restart Antenna System

Figure 3-6
Install Satellite Pair Process

Table 3-1
Available Satellite Pairs - North America (North American LNB Required)

	DSS_101	DSS_119	Echo_61	Echo_110	Echo_119	Echo_148	Expressvu	ExpressTV
DSS_101		✓					✓	✓
DSS_119	✓						✓	✓
Echo_61				✓	✓		✓	✓
Echo_110			✓		✓	✓	✓	✓
Echo_119			✓	✓		✓	✓	✓
Echo_148				✓	✓		✓	✓
Expressvu	✓	✓	✓	✓	✓	✓		✓
ExpressTV	✓	✓	✓	✓	✓	✓	✓	

Table 3-2
Available Satellites - Europe (European LNB/Feed Tube Assembly Required)

Any two of the European satellites listed below can be paired together, as long as the satellites are within range of the antenna:

- Astra1
- Astra2N
- Astra2S
- Hispasat
- HotbirdWB
- Hotbird
- Sirius
- Thor
- Arabsat
- Nilesat
- Optus_B1
- Optus_B3

In Latin America, the system can track either Galaxy_8W or Galaxy_8E to receive DIRECTV Latin America service (Latin American LNB required).

3.4 Restarting the Antenna

To restart the antenna, use the Restart Antenna menu. The antenna will re-initialize and reacquire the satellite.

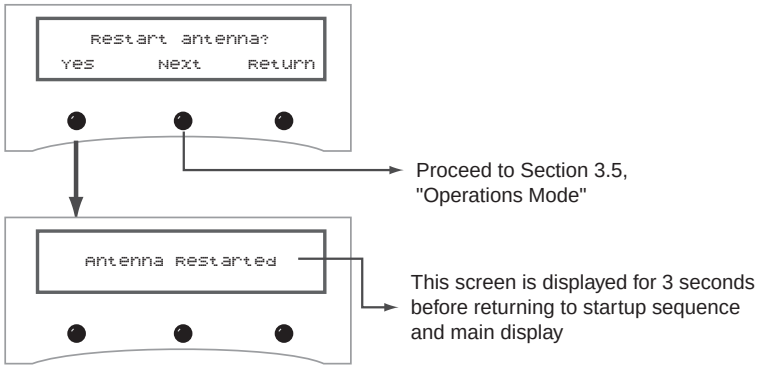


Figure 3-7
Restart Antenna Menu

3.5 Operations Mode

This sequence of menus allows a user to view system information, perform various antenna functions, access internal sensor functions, and set the display brightness.

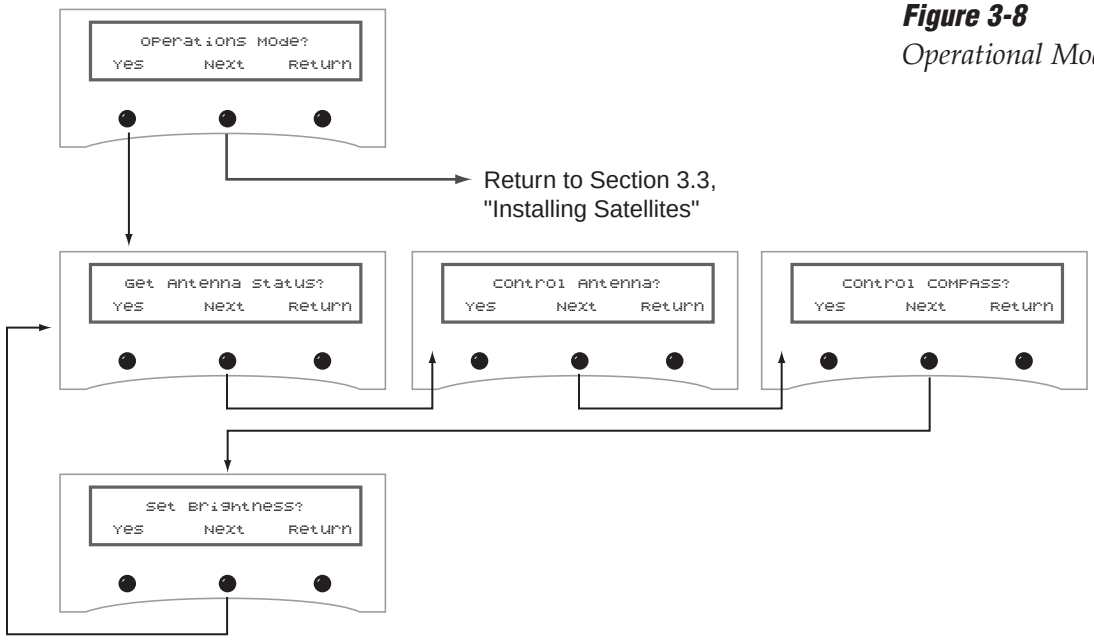
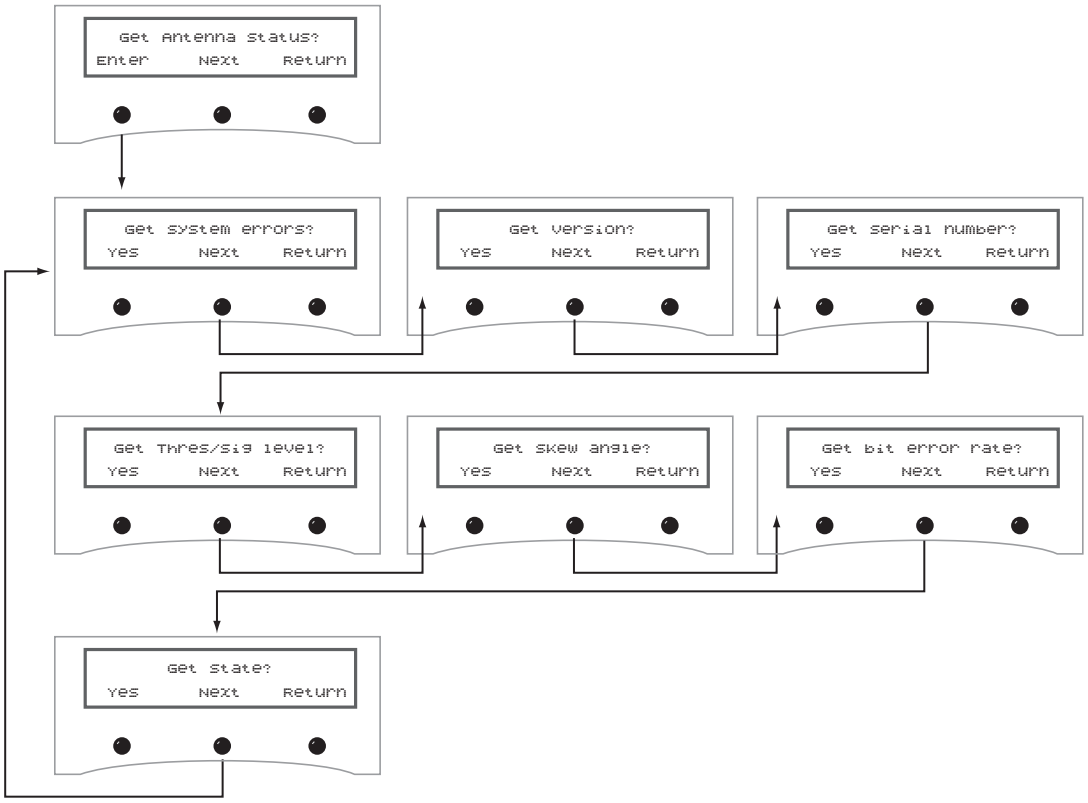


Figure 3-8
Operational Mode Sequence

Antenna Status Mode

This sequence of menus allows a user to scan for system errors, access antenna type, version, and serial number information, check the signal and noise levels, view the skew angle, display the bit error rate, and display the antenna's current state.

Figure 3-9
Antenna Status Mode Menu Sequence



Antenna Status Data Screens

Figure 3-10 shows the information available through the Get Antenna Status mode.

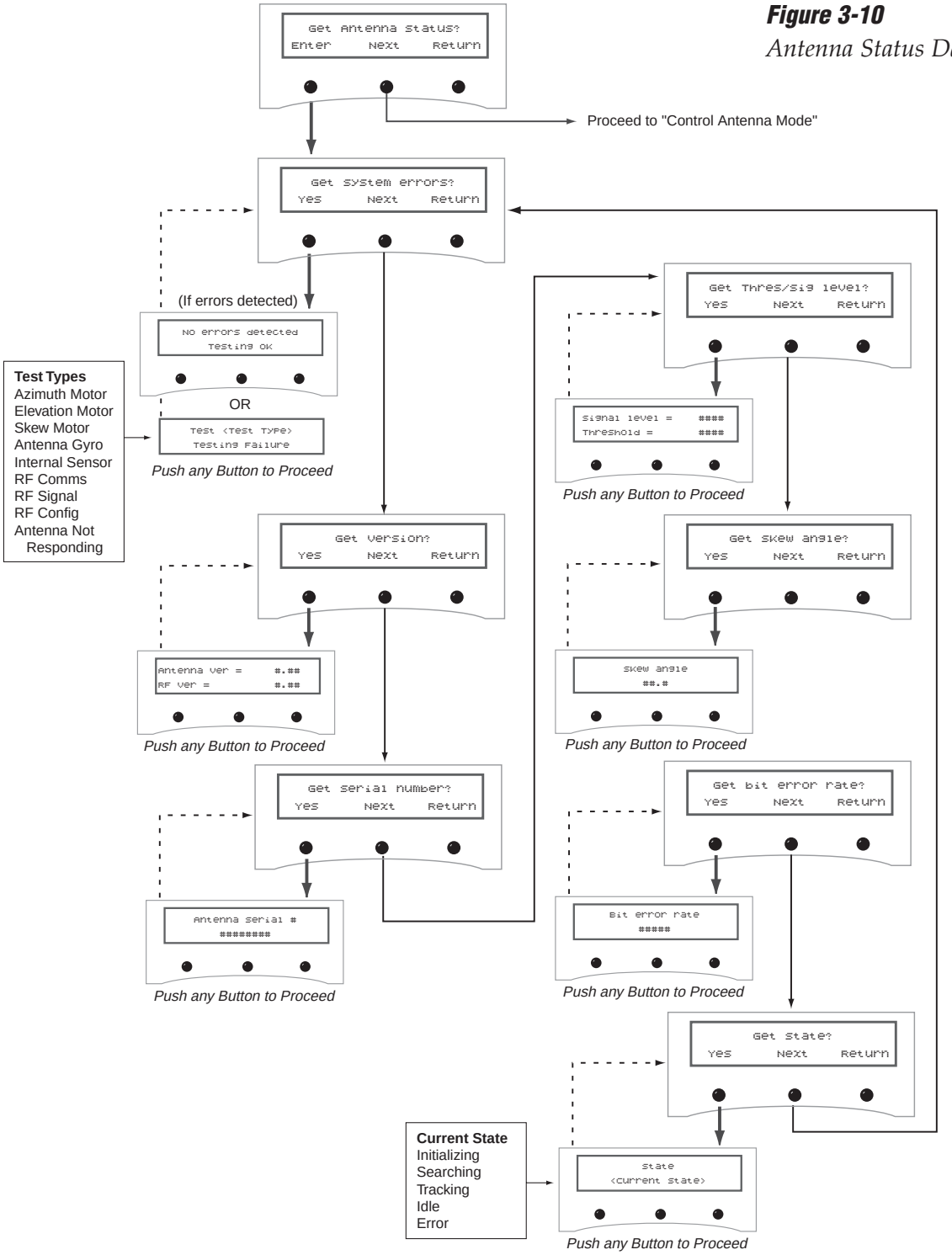
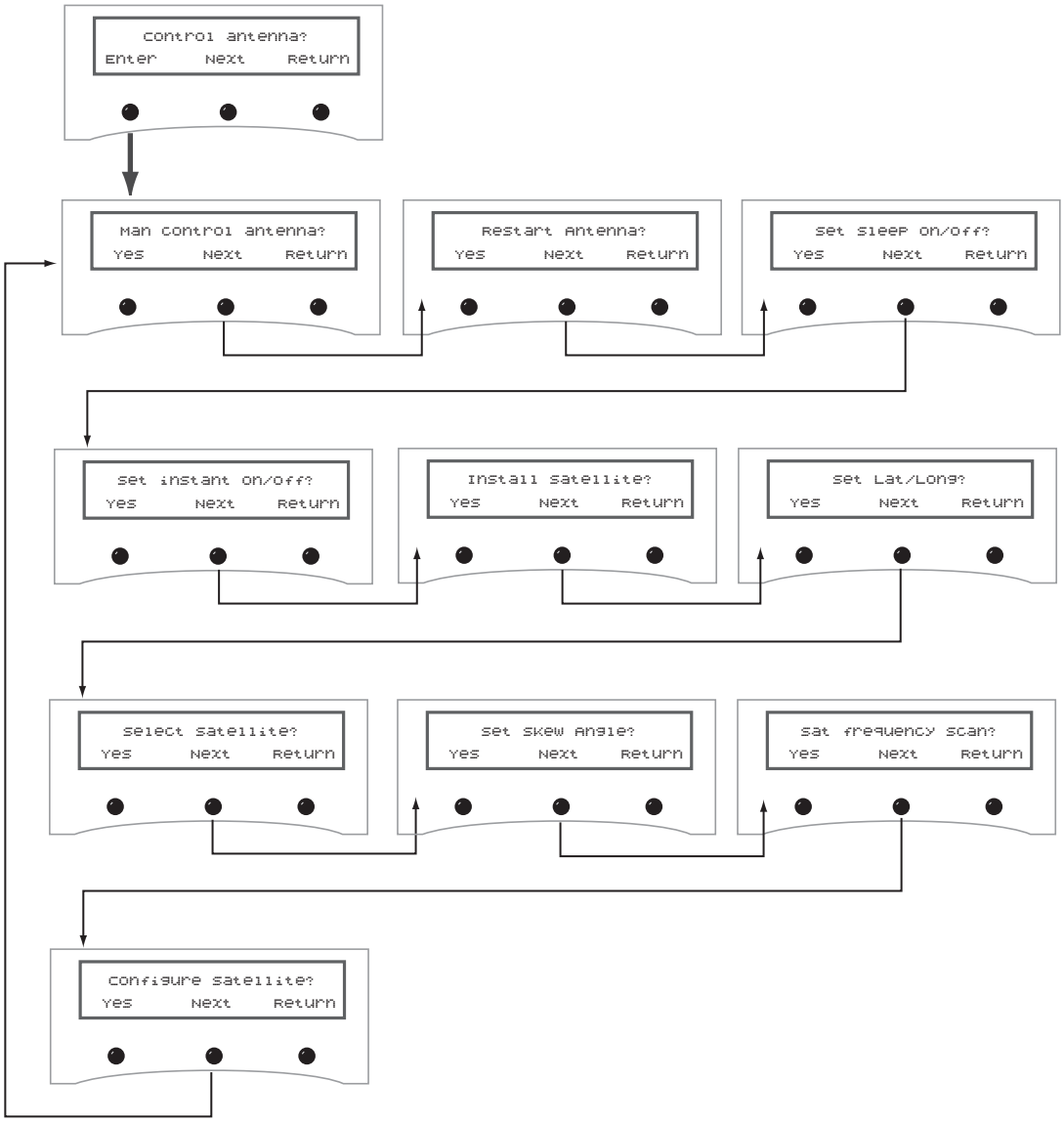


Figure 3-10
Antenna Status Data Screens

Control Antenna Mode

This sequence of menus allows a user to adjust the antenna's azimuth and elevation manually, restart the antenna, turn Sleep Mode on/off, turn Instant On Mode on/off, install a new pair of active satellites, set the latitude and longitude, select the active satellite, adjust the skew angle, update satellite frequency data, and change satellite configuration settings.

Figure 3-11
Control Antenna Mode Menu Sequence



Manually Controlling the Antenna

In certain circumstances, you may need to control the azimuth, elevation, and tracking of the TracVision G8 antenna manually, using the process shown in Figure 3-12. Use the + and - keys to manually move the dish. Azimuth measurements are reported as relative to the bearing of the vessel's bow.

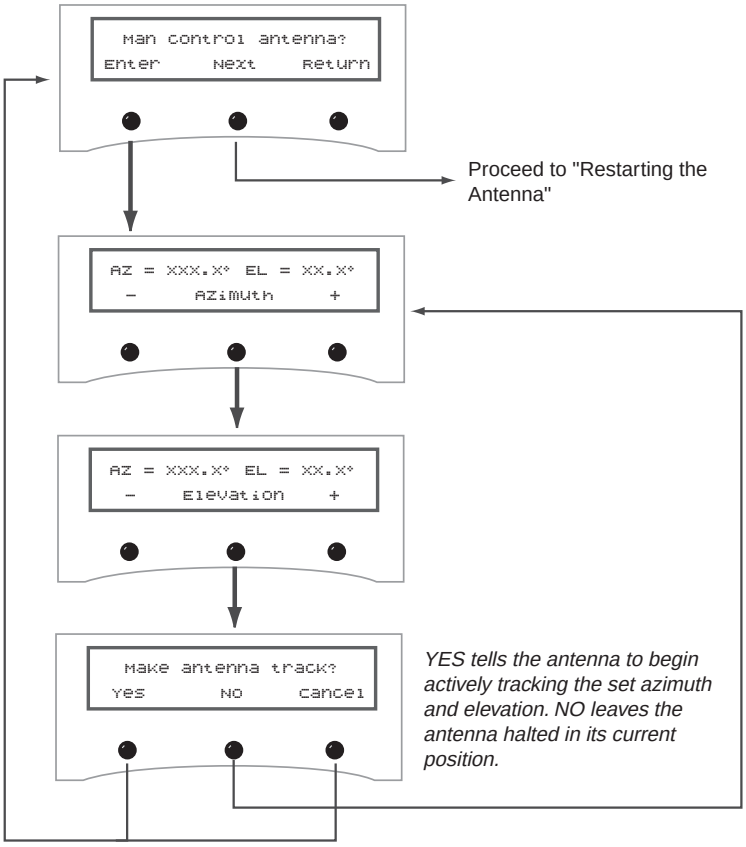

Man control antenna?
Enter Next Return
Proceed to "Restarting the Antenna"
AZ = XXX.X° EL = XX.X°
- AZimuth +
AZ = XXX.X° EL = XX.X°
- Elevation +
Make antenna track?
Yes NO Cancel
YES tells the antenna to begin actively tracking the set azimuth and elevation. NO leaves the antenna halted in its current position.

Figure 3-12
Manual Antenna Control Procedure

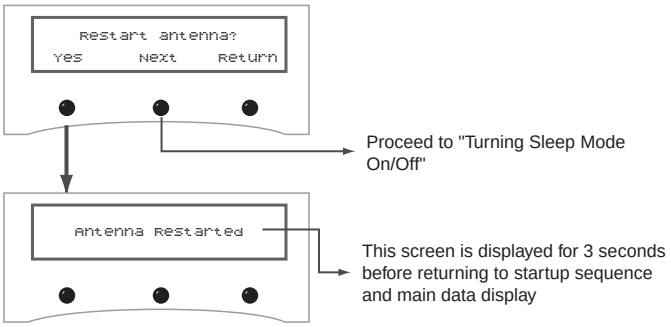
If the manual adjustment of the antenna reached the maximum rotation (720°), the antenna will rotate 360° and return to the Manual Control Antenna screens.

If the system started up in Instant On mode, the following message may be displayed:

Restarting the Antenna

After resetting satellite parameters, it is necessary to restart the antenna before the new settings take effect.

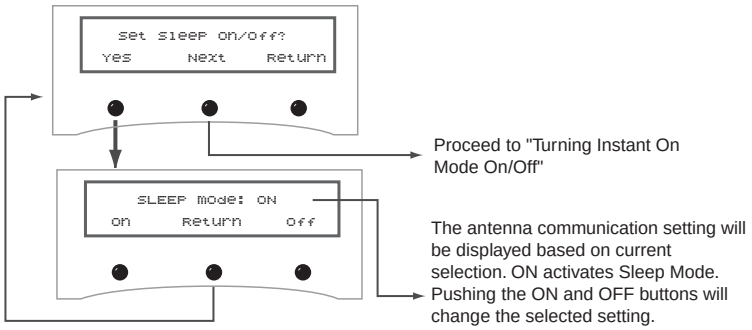
Figure 3-13
Restart Antenna Menu


Restart antenna?
Yes Next Return
Proceed to "Turning Sleep Mode On/Off"
Antenna Restarted
This screen is displayed for 3 seconds before returning to startup sequence and main data display

Turning Sleep Mode On/Off

Sleep Mode turns off conical scan tracking if the antenna holds the same position for one minute. As soon as the vessel moves, the system will automatically begin tracking the satellite again.

Figure 3-14
Sleep Mode Menu

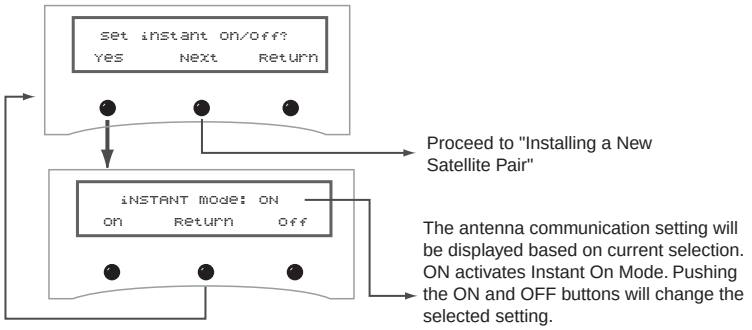

Set sleep On/Off?
Yes Next Return
Proceed to "Turning Instant On Mode On/Off"
SLEEP Mode: ON
On Return Off
The antenna communication setting will be displayed based on current selection. ON activates Sleep Mode. Pushing the ON and OFF buttons will change the selected setting.

The factory default setting for Sleep Mode is ON.

Turning Instant On Mode On/Off

Instant On allows the antenna to immediately receive a TV signal if the vessel has not moved since the antenna was last shut off. If the vessel moves after acquiring the satellite via Instant On, the antenna will undergo its standard initialization process, resulting in a brief interruption of the TV signal.

Figure 3-15
Instant On Mode Menu


Set instant On/Off?
Yes Next Return
Proceed to "Installing a New Satellite Pair"
iNSTANT Mode: ON
On Return Off
The antenna communication setting will be displayed based on current selection. ON activates Instant On Mode. Pushing the ON and OFF buttons will change the selected setting.

The factory default setting for Instant On Mode is OFF.

Installing a New Satellite Pair

TracVision G8 permits two satellite services (Satellites A and B) to be installed simultaneously. There is also an option for **NONE** on Satellite B, permitting single satellite operation.

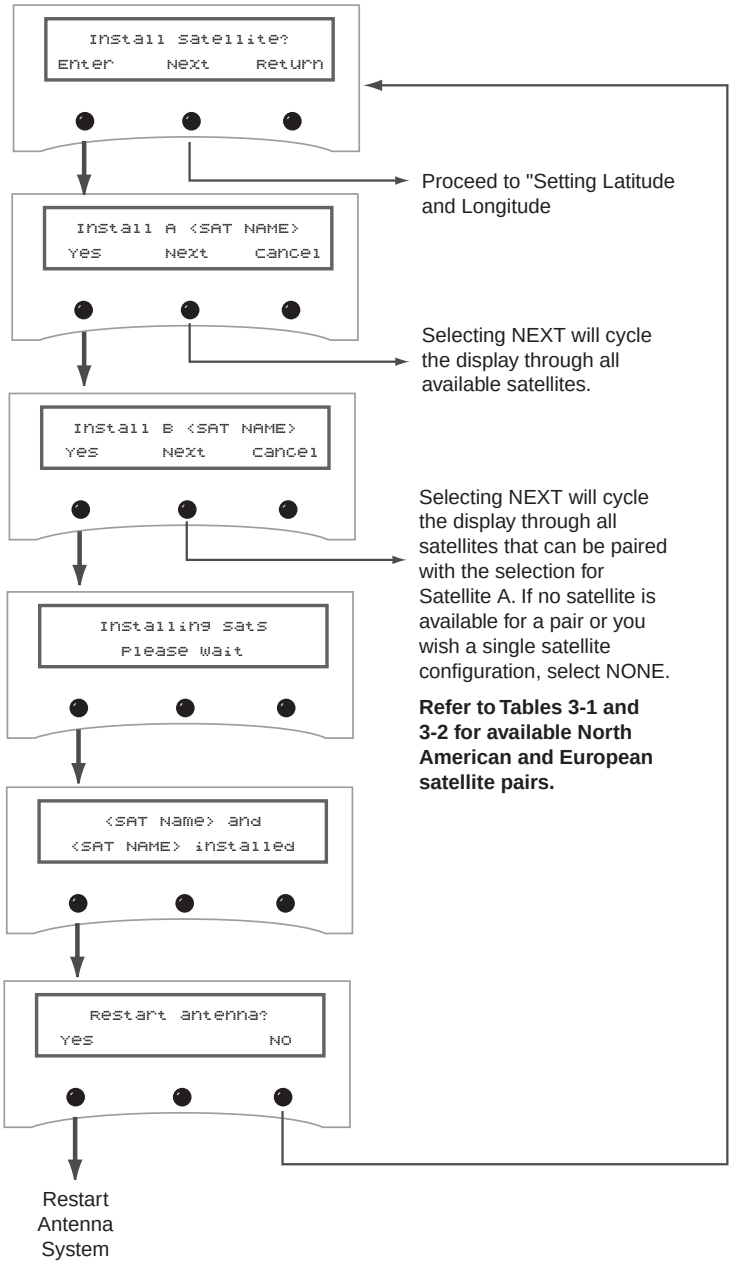

Install satellite?
Enter Next Return
Proceed to "Setting Latitude and Longitude
Install A <SAT NAME>
Yes Next Cancel
Selecting NEXT will cycle the display through all available satellites.
Install B <SAT NAME>
Yes Next Cancel
Selecting NEXT will cycle the display through all satellites that can be paired with the selection for Satellite A. If no satellite is available for a pair or you wish a single satellite configuration, select NONE.
Refer to Tables 3-1 and 3-2 for available North American and European satellite pairs.
Installing Sats
Please Wait
<SAT Name> and
<SAT NAME> installed
Restart antenna?
Yes NO
Restart Antenna System

Figure 3-16
Install Satellite Pair Process

If GPS is providing valid position data to the antenna, manual entry of latitude/longitude is not available.

Setting Latitude and Longitude

If the GPS is blocked, faulty, or unavailable, you can enter the vessel's latitude and longitude to ensure that the installed satellites are viewable, as well as to permit the system to set several internal parameters.

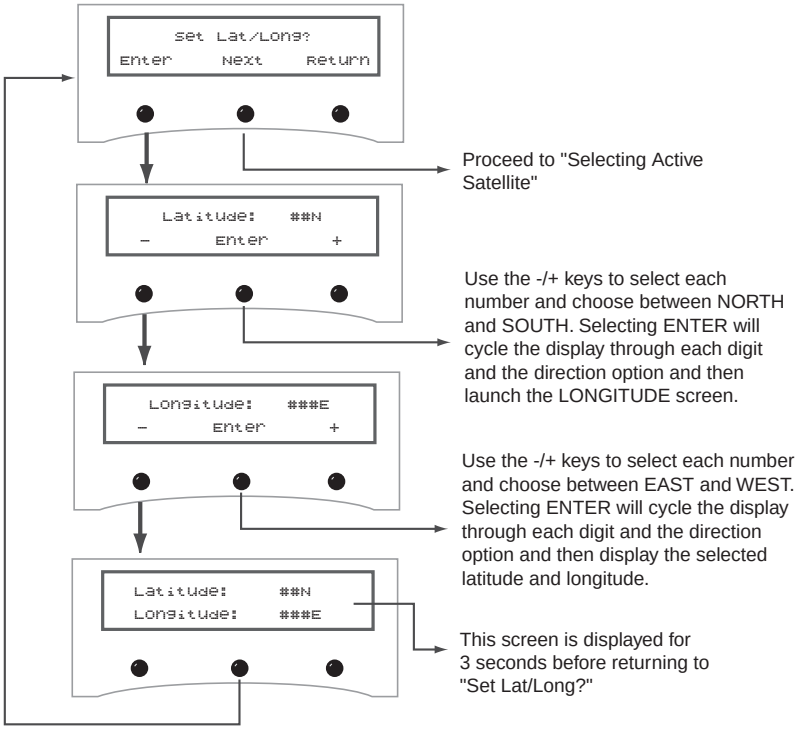
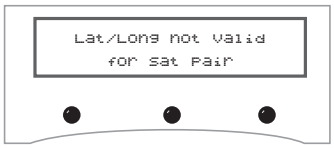

Set Lat/Long?
Enter Next Return
Proceed to "Selecting Active Satellite"
Latitude: ##N
– Enter +
Use the -/+ keys to select each number and choose between NORTH and SOUTH. Selecting ENTER will cycle the display through each digit and the direction option and then launch the LONGITUDE screen.
Longitude: ###E
– Enter +
Use the -/+ keys to select each number and choose between EAST and WEST. Selecting ENTER will cycle the display through each digit and the direction option and then display the selected latitude and longitude.
Latitude: ##N
Longitude: ###E
This screen is displayed for 3 seconds before returning to "Set Lat/Long?"

Figure 3-17
Set Latitude/Longitude

If the latitude and/or longitude entered is not valid for the installed satellite pair, the following screen will appear:



Recheck and re-enter your latitude and longitude and verify your installed satellite pair to resolve this issue.

Selecting Active Satellite

After installing the active pair of satellites, use the Select Satellite menu to choose which of the installed satellites will be active.

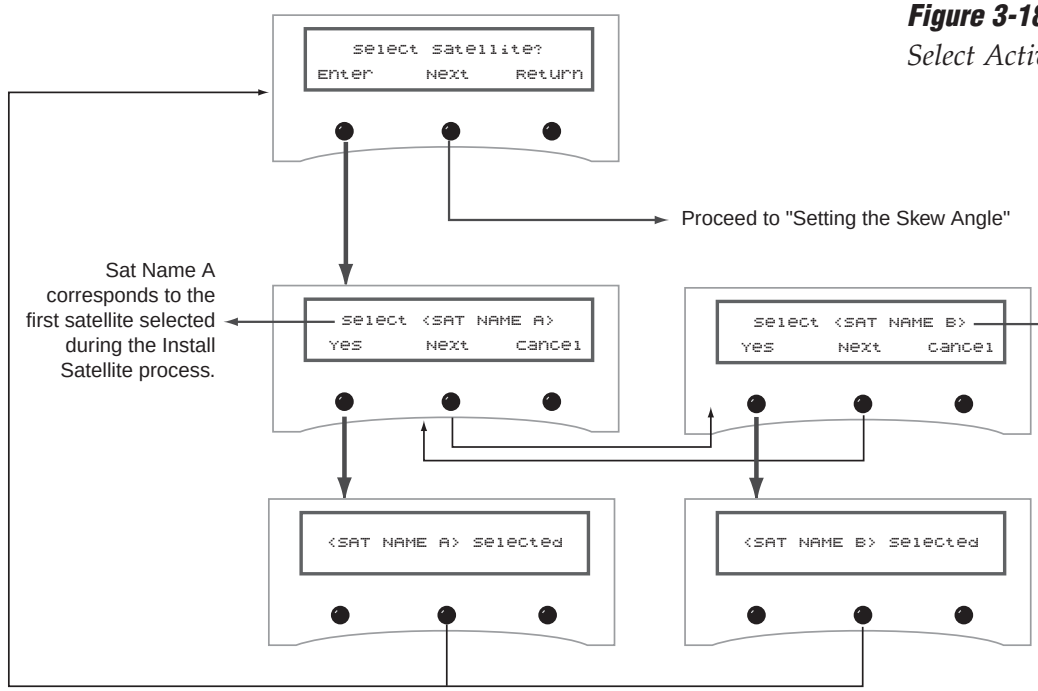

Select Satellite?
Enter Next Return
Proceed to "Setting the Skew Angle"
Sat Name A corresponds to the first satellite selected during the Install Satellite process.
Select <SAT NAME A>
Yes Next Cancel
Select <SAT NAME B>
Yes Next Cancel
Sat Name B corresponds to the second satellite selected during the Install Satellite process.
<SAT NAME A> Selected
<SAT NAME B> Selected

Figure 3-18
Select Active Satellite

European systems only:
If DiSEqC is active on your IRD, once the antenna restarts, the antenna starts tracking the satellite currently selected by the IRD, overriding the Select Satellite command.

Setting the Skew Angle

The Set Skew Angle menu allows you to manually adjust the skew angle of the antenna's LNB.

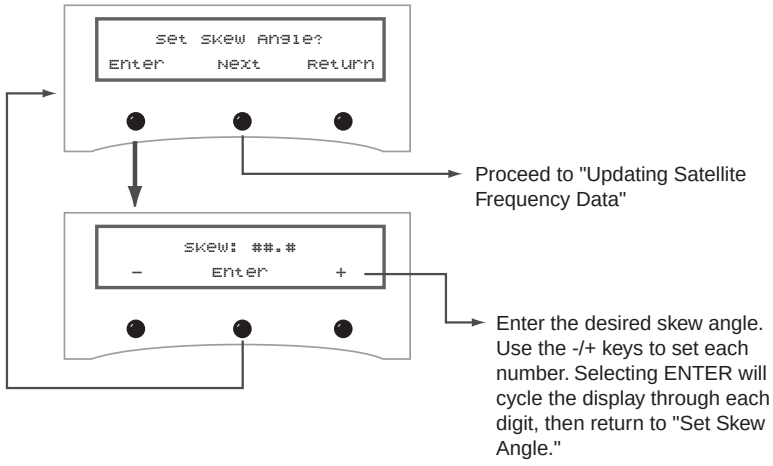

Set Skew Angle?
Enter Next Return
Proceed to "Updating Satellite Frequency Data"
Skew: ##.#
– Enter +
Enter the desired skew angle. Use the -/+ keys to set each number. Selecting ENTER will cycle the display through each digit, then return to "Set Skew Angle."

Figure 3-19
Set Skew Angle Menu

*Do **NOT** use this function unless directed by KVH Technical Support or a KVH-authorized technician. Improper data selection may affect the system's operation.*

Updating Satellite Frequency Data

If the antenna is unable to find a satellite, the satellite's frequency data may have changed. The Satellite Frequency Scan feature allows you to update the frequency data of any satellite stored in the system's library.

This function should not be used unless directed by KVH Technical Support or a KVH-authorized technician.

With the desired satellite, band, and polarization selected, the system will automatically search for the frequency with the strongest signal. The system will then update that satellite's programmed data with the new frequency (and associated network ID) and store it in the satellite library.

To update the satellite frequency data, follow the steps below:

1. Place your IRD in the satellite signal meter mode.
2. Select the desired satellite on the MCU. ***Ensure the TV signal meter indicates that you have a strong signal.***

   If the antenna is unable to find the selected satellite automatically, you can manually point the antenna using the Manual mode (see *"Manually Controlling the Antenna" on page 69*).
3. Select the desired polarization and band on the IRD.
4. ***Do not move the vessel.*** Your boat must remain motionless during the entire Satellite Frequency Scan process.
5. Follow the MCU menus on the next page. The scan itself will take a couple of minutes. Once complete, restart the antenna and ensure the antenna will track the new frequency.

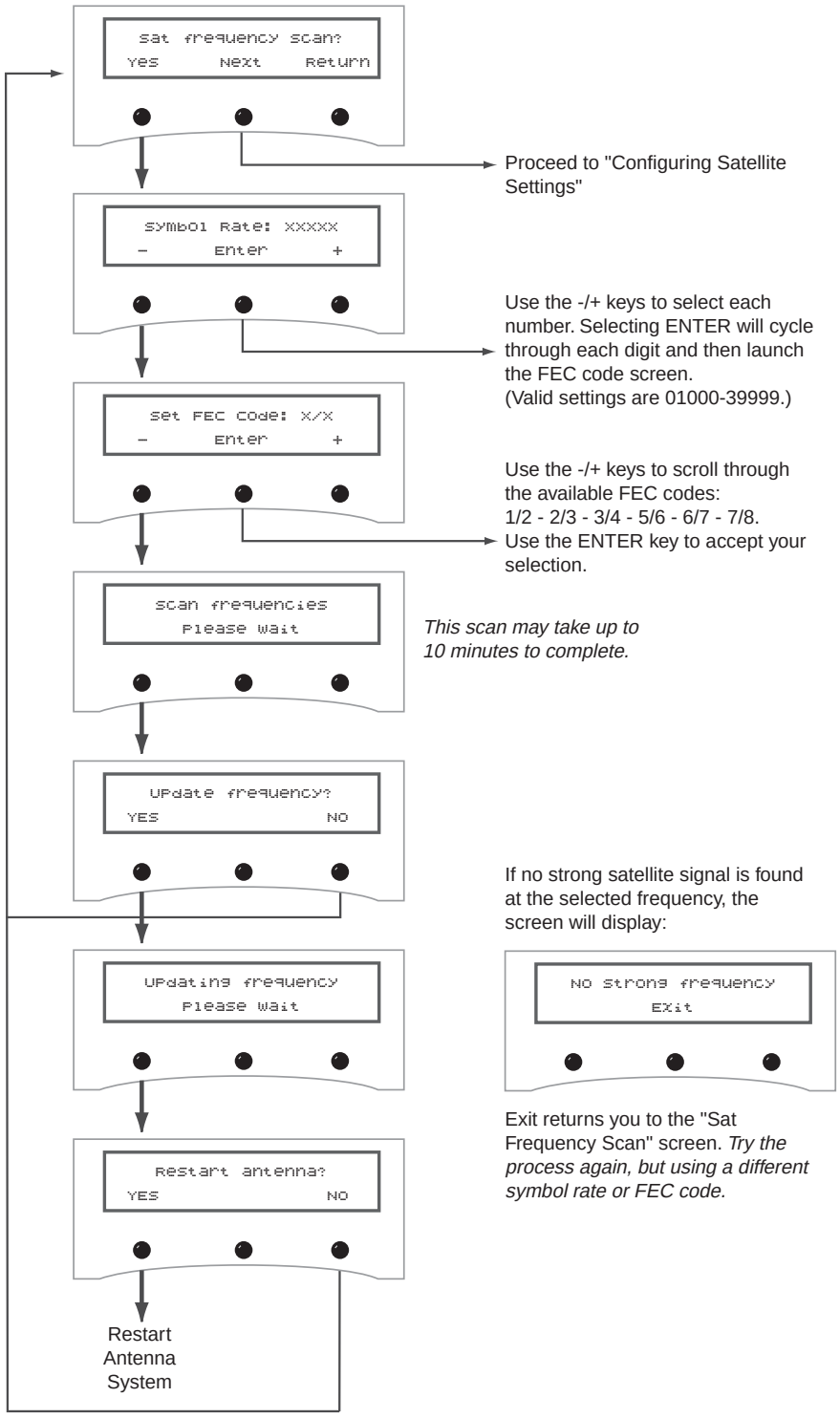

Sat frequency scan?
Yes Next Return
Proceed to "Configuring Satellite Settings"
Symbol Rate: XXXXX
- Enter +
Use the -/+ keys to select each number. Selecting ENTER will cycle through each digit and then launch the FEC code screen.
(Valid settings are 01000-39999.)
Set FEC Code: X/X
- Enter +
Use the -/+ keys to scroll through the available FEC codes:
1/2 - 2/3 - 3/4 - 5/6 - 6/7 - 7/8.
Use the ENTER key to accept your selection.
Scan frequencies
Please Wait
This scan may take up to 10 minutes to complete.
Update frequency?
YES NO
If no strong satellite signal is found at the selected frequency, the screen will display:
Updating frequency
Please Wait
No strong frequency
Exit
Exit returns you to the "Sat Frequency Scan" screen. Try the process again, but using a different symbol rate or FEC code.
Restart antenna?
YES NO
Restart Antenna System

Figure 3-20
Satellite Frequency Scan

To find a valid symbol rate and FEC code, refer to an up-to-date satellite table either in a magazine or on the Internet. For your convenience, this data is available (for the system's predefined satellites) on our web site at www.kvh.com/footprint/index.html.

The vessel must remain stationary during this process.

North American satellites have two polarizations:

- *Left-hand Circular (LHC)*
- *Right-hand Circular (RHC)*

European satellites have four polarizations:

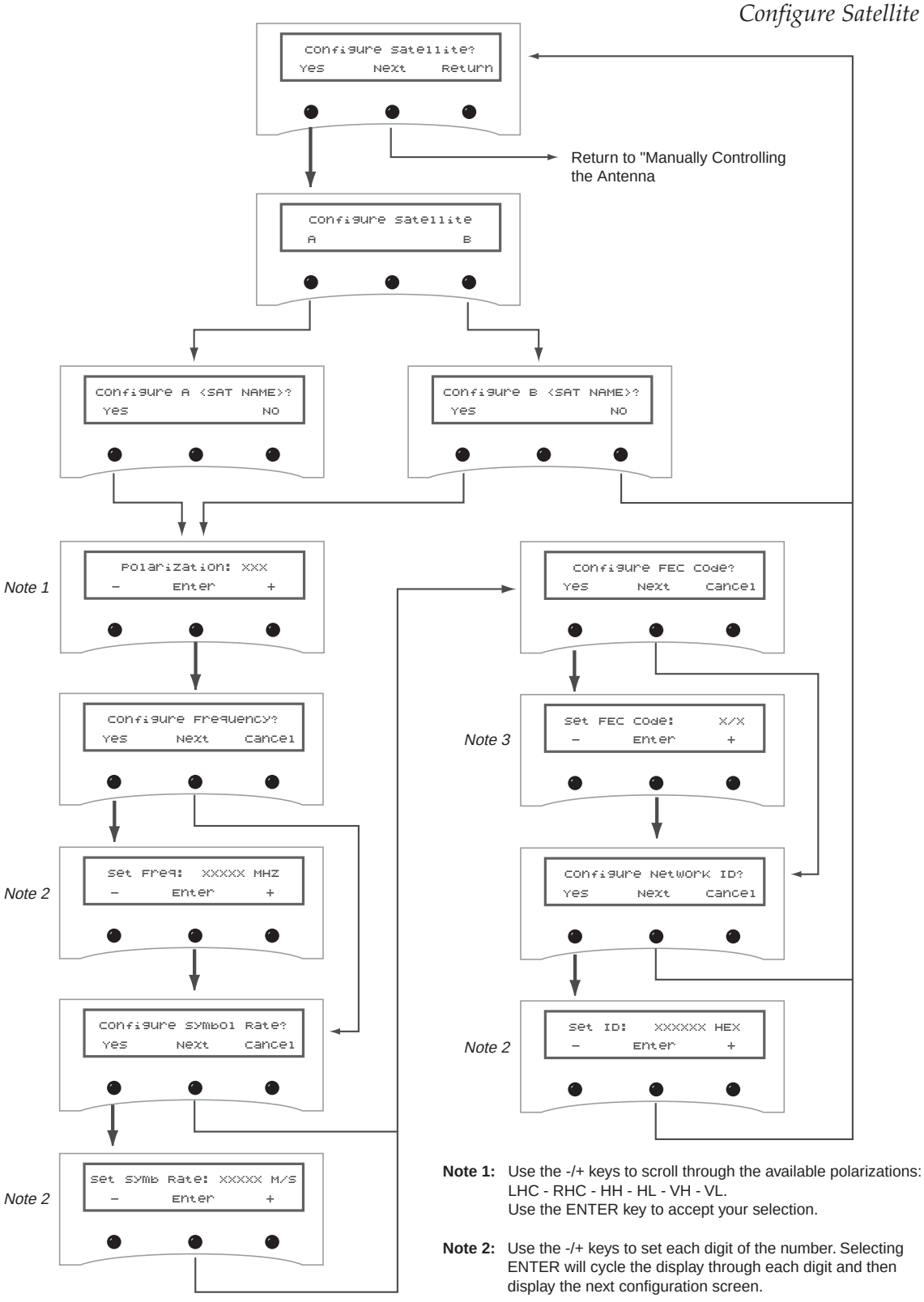
- *Horizontal High (HH)*
- *Horizontal Low (HL)*
- *Vertical High (VH)*
- *Vertical Low (VL)*

Configuring Satellite Settings

The Configure Satellite menu allows you to change the configuration settings for your installed satellites. For each polarization, you can change the following settings:

- Frequency (either 00000 or a number between 10700 - 12700 MHz)
- Symbol Rate (01000 - 45000 Mbit/sec)
- FEC Code (1/2, 2/3, 3/4, 5/6, 6/7, or 7/8)
- Satellite Network ID (0x0000 - 0xffff hex)

Figure 3-21
Configure Satellite



Note 1: Use the -/+ keys to scroll through the available polarizations: LHC - RHC - HH - HL - VH - VL.
Use the ENTER key to accept your selection.

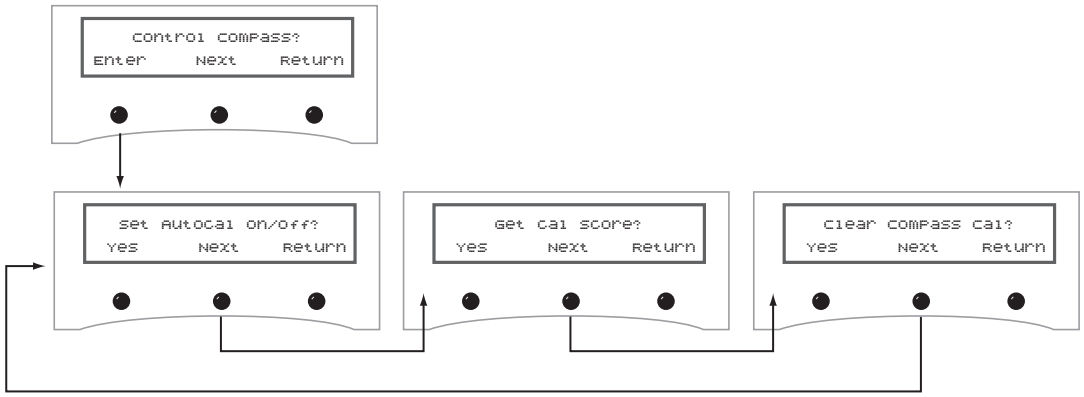
Note 2: Use the -/+ keys to set each digit of the number. Selecting ENTER will cycle the display through each digit and then display the next configuration screen.

Note 3: Use the -/+ keys to scroll through the available FEC codes: 1/2 - 2/3 - 3/4 - 5/6 - 6/7 - 7/8.
Use the ENTER key to accept your selection.

Control Compass Mode

Figure 3-22
Control Compass Mode Menu Sequence

The Control Compass function allows you to turn autocalibration on/off, read the calibration score, and clear the calibration.



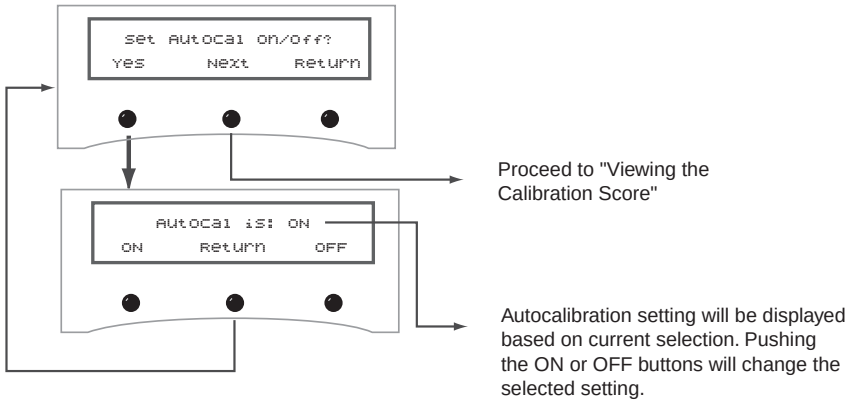
Selecting Autocalibration

The factory default setting for Autocalibration is ON.

Every antenna's internal sensor module is calibrated at the factory in a perfect-world environment. However, hard and soft iron effects on your vessel can distort the local magnetic field, causing errors in the reported heading. These errors are minimized by mounting the antenna in a suitable location and are further removed by the system's autocalibration feature, which compensates for minor magnetic distortions while your vessel is moving. The more the vehicle moves with autocalibration turned on, the more accurate the sensor will become.

Figure 3-23
Setting Autocalibration

A well-calibrated sensor is crucial to system performance. If you shift, remove, or add equipment near the antenna, KVH suggests keeping autocalibration ON so that the sensor will automatically recalibrate itself.


Set Autocal On/Off?
Yes Next Return
Proceed to "Viewing the Calibration Score"
Autocal is: ON
ON Return OFF
Autocalibration setting will be displayed based on current selection. Pushing the ON or OFF buttons will change the selected setting.

Viewing the Calibration Score

The calibration score should be checked the first time you are underway after installing the TracVision G8 and whenever adjustments are made to vessel equipment that can affect the sensor's accuracy.

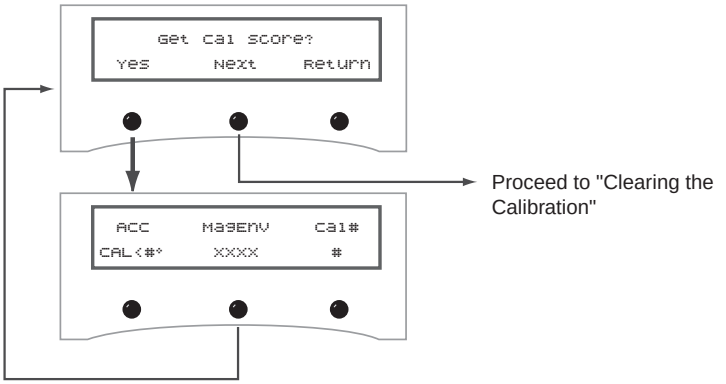


Figure 3-24
Viewing Calibration Score

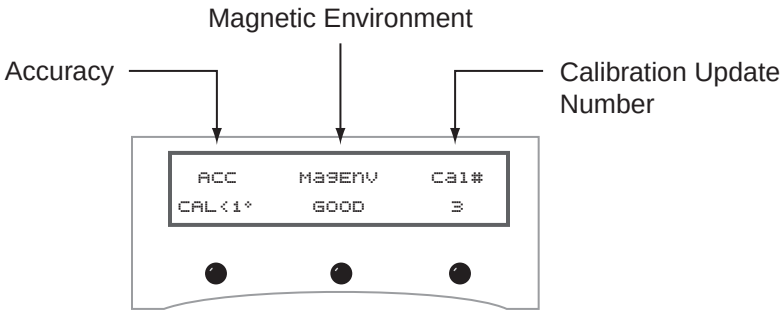


Figure 3-25
Sample Calibration Score Screen

Accuracy (ACC)

The ACC data indicates the sensor's degree of accuracy. Table 3-3 lists the five possible accuracy levels.

Magnetic Environment (MAGENV)

The MAGENV score (GOOD, OK, POOR, BAD) indicates the quality of the installation location. If the quality is POOR or BAD, the antenna may need to be moved to a more favorable magnetic environment, or the source of magnetic interference needs to be relocated.

Calibration Update Number (CAL #)

The CAL # indicates the number of times the sensor has calibrated itself. It is used primarily to verify whether a new calibration has been accepted by the system.

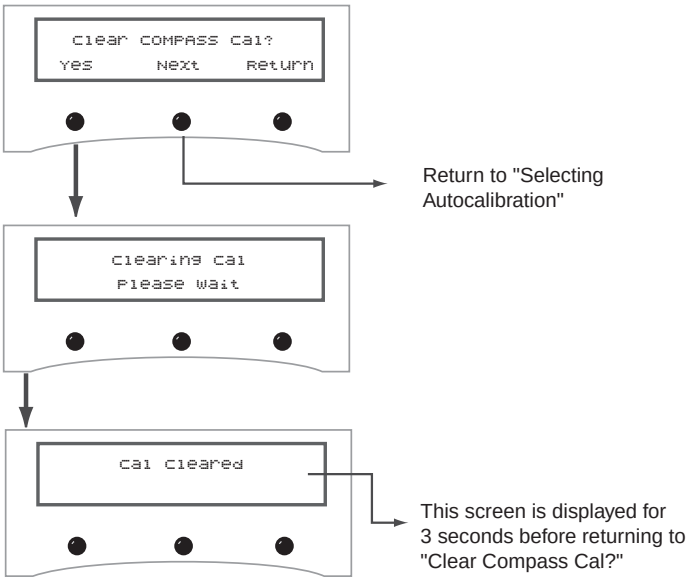
Table 3-3
Possible Compass Accuracy Levels

ACC Score	Accuracy
<1°	Better than 1°
<2°	Better than 2°
<4°	Better than 4°
<8°	Better than 8°
BAD CAL	Poor cal

Clearing the Calibration

Clearing the calibration resets the system to the factory defaults.

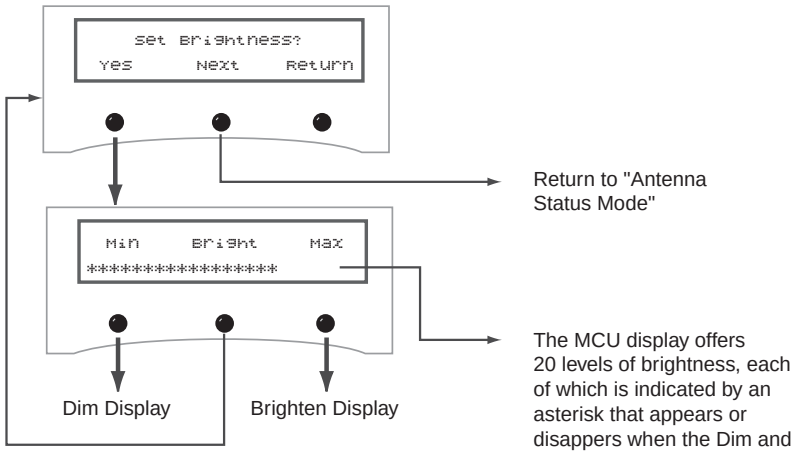
Figure 3-26
Clearing the Calibration


Clear COMPASS Cal?
Yes Next Return
Return to "Selecting Autocalibration"
Clearing Cal
Please Wait
Cal Cleared
This screen is displayed for 3 seconds before returning to "Clear Compass Cal?"

Setting Display Brightness

The MCU display's brightness may be adjusted to suit your preferences. Press the right-hand key to make the display brighter; press the left-hand key to make it dimmer. When you are satisfied with the setting, press the center key to accept the setting.

Figure 3-27
Setting Display Brightness


Set Brightness?
Yes Next Return
Return to "Antenna Status Mode"
Min Bright Max
****
The MCU display offers 20 levels of brightness, each of which is indicated by an asterisk that appears or disappers when the Dim and Brighten keys are pressed.
Dim Display
Brighten Display

4 — Troubleshooting

This section identifies basic trouble symptoms and lists their possible causes and solutions.

Contents

4.1 Troubleshooting Matrix 83
4.2 Causes and Remedies for Common Operational Issues 84
4.3 IRD Troubleshooting 87
4.4 Antenna Gyro and LNB Faults 87
4.5 Computer Diagnostics 88
4.6 Maintenance Port Parser Commands 89

4.1 Troubleshooting Matrix

The troubleshooting matrix shown in Table 4-1 identifies some trouble symptoms, their possible causes, and references to troubleshooting solutions.

Table 4-1
Troubleshooting Matrix

Key
1 = Anyone can do
2 = Electronics know-how recommended
3 = Dealer service recommended

Section 4.2

SYMPTOM / POSSIBLE CAUSE (AND SOLUTION)	Power disturbance, blown fuse, or low power	Improper wiring	Vessel turning during startup	Data/power cable interference	Incorrect satellite configuration	Satellite signal blocked	Satellite coverage issue	Radar interference	Satellite frequency data changed	Incorrect or loose RF connectors	Type of multiswitch used	IRD faulty or improperly configured (Section 4.3)	Antenna gyro faulty (Section 4.4)	LNB assembly faulty (Section 4.4)
Antenna non-functional	1	2												
Antenna not switching satellites via IRD		2			1	1	1		3	2	2	2		2
Antenna not switching satellites via MCU		2			1	1	1		3					2
No picture on TV set						1	1	2		2	2	2		2
Certain channels do not work		2			1	1	1		3	2		2		2
Intermittent picture for short intervals			1			1	1	2		2	2		3	2
System works at dock but not on the move						1							3	
System will not find satellite		2	1		1	1	1	2	3	2	2	2	3	2
Snowy television picture		2		1						2		2		
Pixelating television picture		2				1		2		2		2	3	2

4.2 Causes and Remedies for Common Operational Issues

There are a number of common issues that can affect the performance of the TracVision G8. The following sections address these issues and potential solutions.

Power Disturbance, Blown Fuse, or Low Power

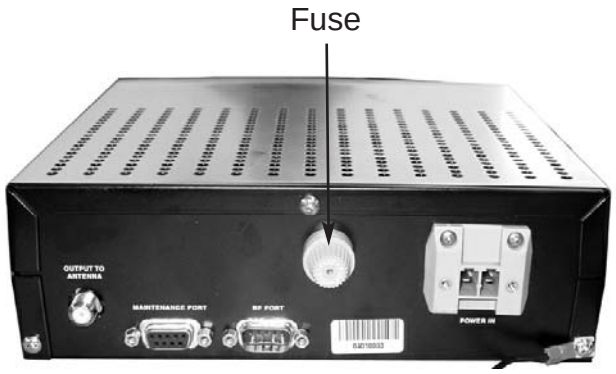
Power Disturbance

If the MCU detects a power disturbance, such as a voltage spike, the system shuts itself down. If this occurs, simply disconnect power from the MCU, **wait 20 seconds**, then restore power.

Blown Fuse

The antenna unit is equipped with a 5-amp, 125-volt fast-blow fuse on the PCB module. The MCU is equipped with a 30-amp, 125-volt fast-blow fuse on its rear panel. If either of these fuses has blown or been broken, the system will not work. To access the MCU fuse, simply unscrew the fuse holder cap on the rear panel. For details on accessing the antenna's PCB module fuse, refer to *"Replacing the PCB Module Fuse" on page 96*.

Figure 4-1
MCU Fuse



Low Power

If the data/power cable from the antenna unit to the power source or MCU is more than 50 ft (15 m) in length, the power level can decrease over the course of the cable, resulting in a voltage level at the antenna unit that is too low to power the system. Refer to *"Connecting Vessel Power and the IRD Ground Wire" on page 36* for details on supplying adequate power to the antenna unit.

Improper Wiring

If the system has been improperly wired, the antenna unit will not operate correctly. Refer to *Section 2.4, "Wiring the MCU," on page 35* for complete system wiring information.

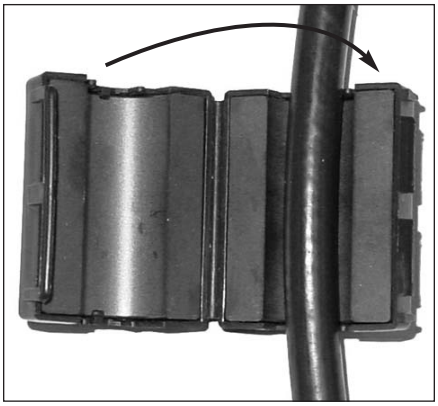
Vessel Turning During Startup

If the vessel turns during the two-minute startup sequence that occurs immediately after turning on the power to the TracVision G8, the antenna will record that variable motion as "standing still." This may cause the antenna to track improperly. To solve this problem, turn the TracVision G8 off for at least 10 seconds. Turn the system back on, ensuring that the vessel is either motionless or traveling in a straight line for the two minutes immediately following power-up.

Data/Power Cable Interference

Depending on how cables are routed, conducted emissions from the system's data/power cable may cause reduced picture quality on your TV screen. If the picture quality degrades only when the TracVision G8 is operating, try installing the small ferrite coil supplied in the kitpack. Simply clamp it onto the data/power cable to reduce its conducted emissions (see Figure 4-2).

Figure 4-2
Small Ferrite Coil



Incorrect Satellite Configuration *(European Systems Only)*

The satellite configuration on European IRDs must match the satellite settings on the TracVision G8 system.

- Satellite A on the TracVision G8 must be the same satellite as IRD Alternative 1 (or A, based on your IRD) and must be assigned the IRD DiSEqC 1 setting.
- Satellite B on the TracVision G8 must be the same satellite as IRD Alternative 2 (or B, based on your IRD) and must be assigned the IRD DiSEqC 2 setting.

Refer to your IRD user manual for complete instructions on configuring your IRD.

Satellite Signal Blocked

Satellite signals can be blocked or degraded by buildings, other vessels, or equipment on the vessel itself. Refer to *"Choosing the Best Location for the TracVision Antenna" on page 23* to make certain that the TracVision G8 antenna unit is in the optimal location. Simply moving the vessel to clear an external obstruction will also restore signal quality.

For your convenience, KVH provides links to several web sites that offer satellite coverage information. Simply go to our web site at www.kvh.com/footprint/index.html.

Satellite Coverage Issue

TracVision G8 will provide outstanding reception within the 32" (82 cm) antenna coverage area for your satellite television service of choice. However, signal quality can be degraded as you approach the fringe coverage areas. Refer to your satellite television service manual to check the viable coverage area for a 32" (82 cm) antenna.

Radar Interference

The energy levels radiated by radar units can overload the antenna's front-end circuits. Refer to *"Choosing the Best Location for the TracVision Antenna" on page 23* to make certain that the TracVision G8 antenna unit is in the optimal location with regard to your radar unit.

Satellite Frequency Data Changed

If some channels work, while one or more other channels do not, or the antenna cannot find the satellite, the selected satellite's frequency data may have changed. To update this frequency data, refer to *"Updating Satellite Frequency Data" on page 74*.

Incorrect or Loose RF Connectors

As part of preventive maintenance (described in *Section 5.2, "Preventive Maintenance," on page 93*) KVH recommends checking the antenna unit's cable connections. A loose RF connector can reduce the signal quality. In addition, if you are unable to switch satellites using your IRD remote, make sure that your IRD's RF cable is connected to the antenna's RF1 baseplate connector (see *Section 2.3, "Connecting the IRD(s)," on page 31*).

Type of Multiswitch Used

An active (not passive) multiswitch must always be used to connect the TracVision G8 system to multiple IRDs. Refer to *Section 2.3, "Connecting the IRD(s)," on page 31* for directions on proper multiswitch/multiple IRD cabling.

4.3 IRD Troubleshooting

The IRD that was provided with your satellite television service may also be the cause of less-than-ideal operation. First check the IRD's configuration to ensure it is set up for the desired programming. In the case of a faulty IRD, refer to your IRD user manual for service and warranty information. If the IRD is both configured properly and fully functional, contact your local KVH dealer or service center for assistance.

4.4 Antenna Gyro and LNB Faults

Section 5, "Maintenance," provides detailed instructions for authorized service personnel who may be required to replace one of the antenna gyros or the LNB.

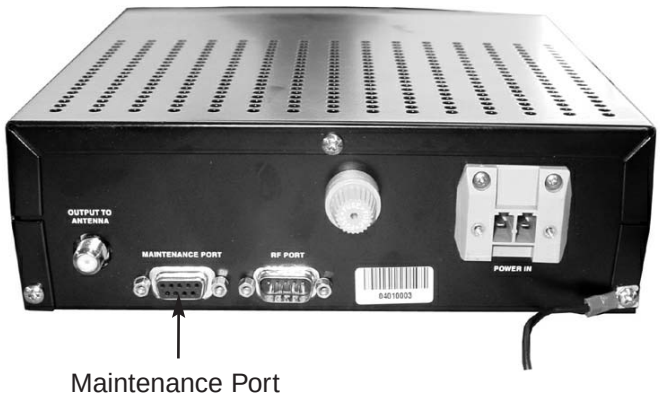
4.5 Computer Diagnostics

TracVision G8 has been designed to provide diagnostic readouts viewed on a PC having an RS-232 serial communication port. If you are unable to isolate a system problem, set up for computer diagnostics as described below. System problems will most likely be found somewhere through the diagnostic readouts.

The diagnostics procedure requires Windows Hyperterminal (or other terminal emulation software, such as PROCOMM). Use the settings appropriate to your application.

1. Connect one end of the PC data cable to the DB9 maintenance port connector on the rear of the MCU. Connect the other end to the serial port on your PC (a 9-pin/25-pin connector adapter may be needed for some PCs).

Figure 4-3
MCU Maintenance Port



2. Open the terminal emulation software and establish the following settings:
   - 9600 baud
   - no parity
   - 8 data bits
   - 1 start bit
   - 1 stop bit
   - no flow control
3. Apply power to the TracVision G8 system and allow the system to complete full initialization. Data should be scrolling on the PC display to identify any system problems detected. If no data is seen, recheck your connections and the terminal software setup.

4.6 Maintenance Port Parser Commands

TracVision G8 system parser commands are detailed in *Appendix E on page 135*.

5 – Maintenance

This section identifies system components that may be replaced in the field, details how to replace those components, and lists preventive maintenance routines.

Contents

5.1 Warranty/Service Information 93
5.2 Preventive Maintenance 93
5.3 TracVision G8 Field Replaceable Units 94
5.4 Accessing Antenna Components Through the Hatch 96
5.5 Replacing the PCB Module Fuse 96
5.6 Replacing the Main PCB 97
5.7 Replacing the RF PCB 100
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5.10 Replacing the Elevation Gyro 106
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5.17 Replacing the LNB 120
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5.19 Preparing for Shipment 123

5.1 Warranty/Service Information

For information on KVH warranty, repair, and liability policies, please refer to the complete warranty statement provided at the conclusion of this manual. If you have any questions, please call your local authorized dealer/installer or distributor, or contact KVH or KVH Europe directly.

IMPORTANT! Before returning the product, be sure to obtain an RMA number from KVH's Technical Support Department and write the number on the outside of the box. Shipments received without an RMA number will be returned to you at your expense.

Detailed information on KVH's global support program and how to contact KVH or a dealer near you is available at www.kvh.com/global_support.

5.2 Preventive Maintenance

TracVision G8 requires minimal preventive maintenance. The following tasks are sufficient to maintain peak performance.

When cleaning the radome, avoid any compounds that react with plastic.

Monthly

- Wash the exterior of the radome and baseplate assembly with fresh water; a mild detergent may be added to remove grime. Use caution when spraying the radome directly with high-pressure water.
- Do not apply abrasive cleaners or volatile solvents such as acetone to the ABS radome.
- Check all connectors at the MCU, antenna baseplate, and IRD. Remove connectors and examine for signs of corrosion; clean as needed.

Semi-Annually

- Remove the radome and examine the interior of the antenna unit for signs of corrosion, loose connections, or frayed or broken wires.

5.3 TracVision G8 Field Replaceable Units

The serial number for your TracVision G8 will be required during any troubleshooting or service calls. You will find the serial number on the first page of this manual. (You can also find the serial number by using the MCU's Get Antenna Status mode; see "Antenna Status Data Screens" on page 67 for details.)

If you experience an operating problem or need technical assistance, please contact your local authorized TracVision G8 dealer/installer or distributor. If one is not located nearby, contact KVH or KVH Europe directly at the phone, fax, or e-mail listings on the first page of this manual.

Replacement part numbers for field replaceable units (FRUs) that can be serviced in the field are listed in Table 5-1. These parts may be obtained from any KVH authorized dealer/installer or may be ordered directly from KVH.

Table 5-1
TracVision G8 Field Replaceable Units

FRU	Part Number
Radome	02-1255
Main PCB	02-1281
RF PCB	02-1342
Master Control Unit (MCU)	02-1265
Azimuth Fiber Optic Gyro (FOG)	02-1156-03
Elevation or Roll Gyro	19-0222
Internal Sensor (with GPS)	02-1266
Azimuth Motor	02-1351
Elevation Motor	02-1350
Elevation Belt	24-0105-0137
Skew Motor	19-0110
Skew Belt	24-0124-0144
North American LNB	02-0870
North American LNB/Feed Tube Assembly	02-1282--01
Latin American LNB Assembly	02-0870-01
Latin American LNB/Feed Tube Assembly	02-1282-03
European LNB Assembly	02-1323
European LNB/Feed Tube Assembly	02-1282-04
Data/power Cable	32-0744-100
PC Cable	32-0628-06
IRD Ground Cable	32-0583-50
MCU Fuse	16-0029-30
PCB Module Fuse	16-0029-05

To help us continually improve the quality and reliability of our systems, please return any failed component to KVH or KVH Europe (in care of the mailing address listed on the first page of this manual) after you receive your replacement part.

The antenna unit's printed circuit boards (PCBs), gyros, LNB, motors, belts, and internal sensor may be removed and replaced on site using common hand tools. Other TracVision G8 service must be done by your authorized dealer/installer, distributor, or by KVH. Evidence of tampering or unauthorized repairs will void the warranty. The following sections provide step-by-step procedures for removing and replacing field replaceable units.

Figures 5-1 and 5-2 depict the locations of a number of components within the TracVision G8 antenna unit.

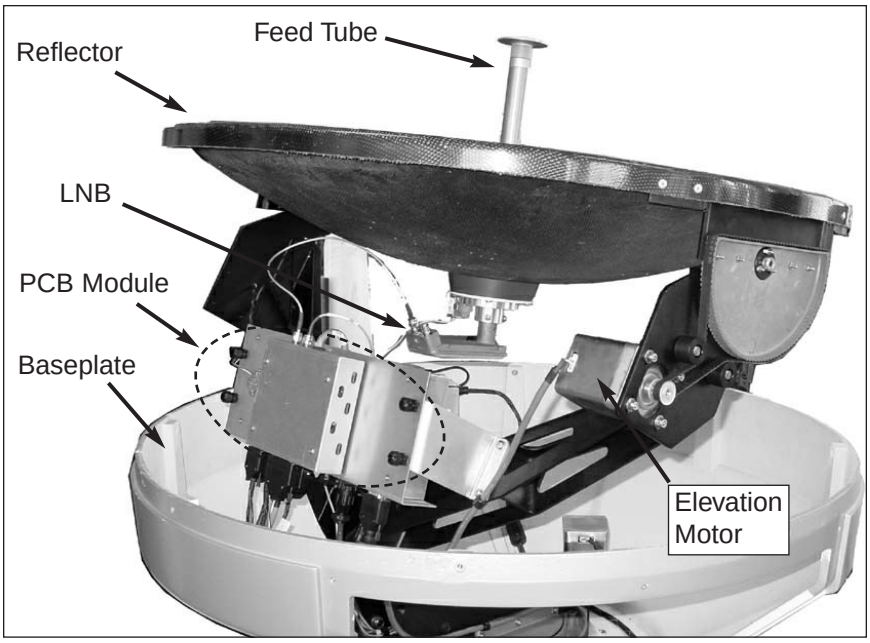


Figure 5-1
TracVision G8 Antenna Unit (Front View)

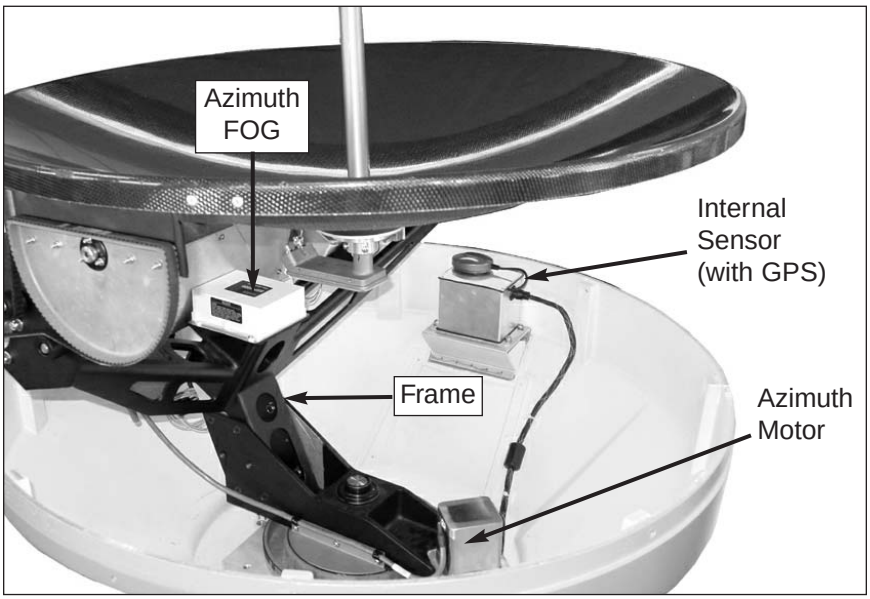


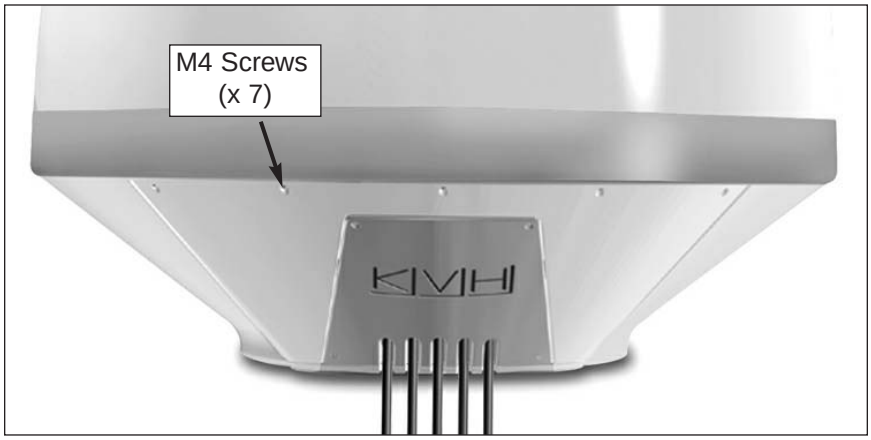
Figure 5-2
TracVision G8 Antenna Unit (Rear View)

TracVision G8 components receive power from multiple sources. Do not open any electrical assemblies or attempt servicing until IRD power and vessel input power are disconnected.

5.4 Accessing Antenna Components Through the Hatch

You can access all field replaceable units through the large hatch on the antenna baseplate. You do not need to remove the radome. To remove the hatch cover, simply remove the seven M4 screws securing the hatch cover to the baseplate.

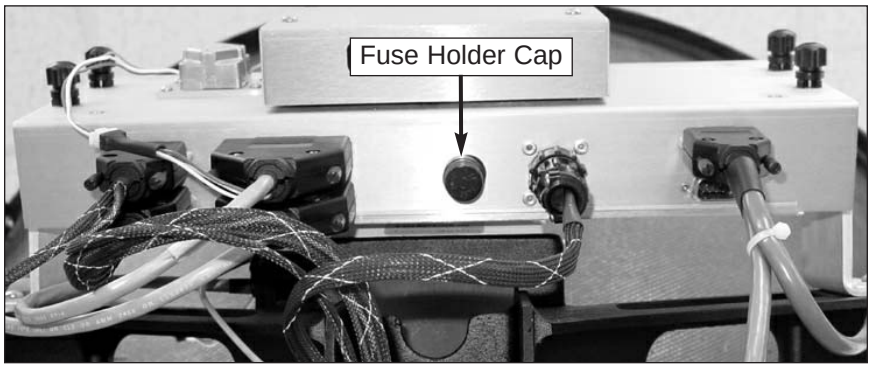
Figure 5-3
Baseplate Access Hatch



5.5 Replacing the PCB Module Fuse

The PCB module is equipped with a 5-amp, 125-volt fast-blow fuse. If this fuse has blown or been broken, simply unscrew the fuse holder cap on the PCB module and replace the fuse.

Figure 5-4
PCB Module Fuse Location



5.6 Replacing the Main PCB

1. With a PC connected to the MCU's maintenance port, apply power to the antenna unit.
2. Record the serial number for later re-entry.
3. Disconnect power from the antenna unit and the IRD.

The main PCB is protected within a metal enclosure that is fastened to the antenna frame. This PCB module, which contains both the main PCB and the RF PCB, must be removed to gain access to the main PCB.

4. Disconnect all cables from the bottom of the PCB module, including the roll gyro cable at the in-line connector.

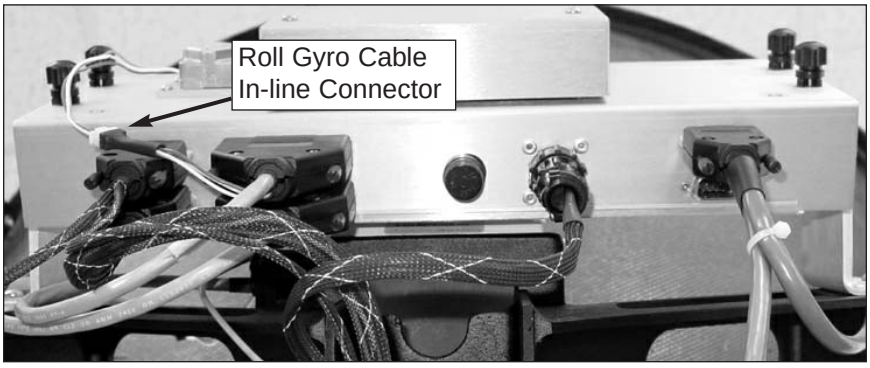


Figure 5-5
PCB Module Connectors (Bottom View)

5. Using a 7/16" wrench, **carefully** disconnect the RF cables from the top of the PCB module.

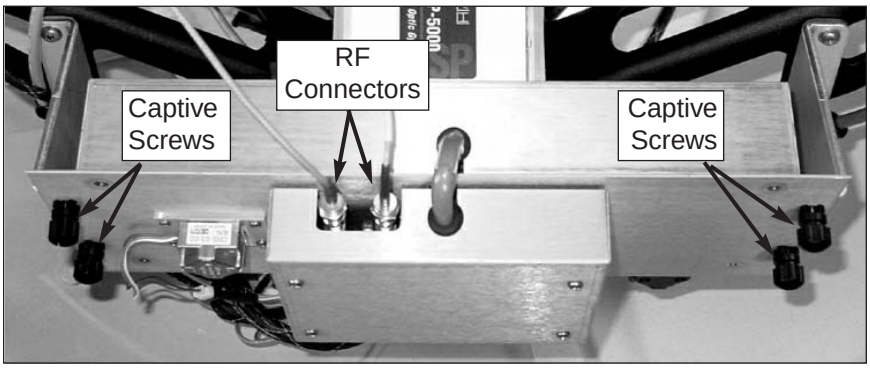


Figure 5-6
PCB Module Connectors (Top View)

6. Loosen the four captive screws securing the PCB module to the antenna frame. Remove the PCB module and bring it belowdecks for bench work.

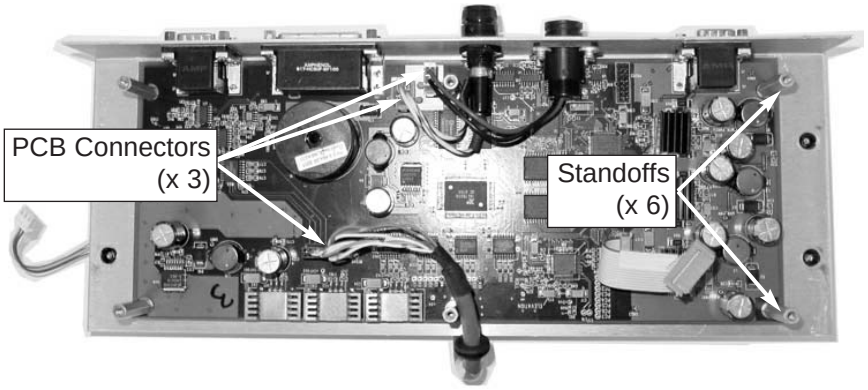
Refer to Section 4.5, "Computer Diagnostics," on page 88 for complete details on connecting a PC to the system via the maintenance port.

7. Remove the six #6-32 screws and flat washers securing the main PCB cover to the PCB module. Set aside the PCB cover.

Figure 5-7
Main PCB Cover

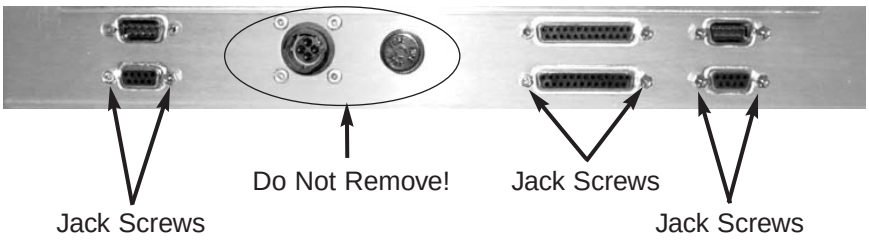
8. Disconnect the three connectors from the main PCB.

Figure 5-8
Main PCB



9. Using a 3/16" nut driver/socket, remove the two jack screws from each of the four DB9 connectors and the two DB25 connectors on the PCB module's connector plate.

Figure 5-9
PCB Module Connector Plate



10. Using a 1/4" nut driver/socket, remove the six #6-32 standoffs securing the PCB to the PCB module (see Figure 5-8). Remove the old PCB.

11. Apply a drop of Loctite threadlocker to the screw ends of the six standoffs and secure the new PCB to the PCB module with the standoffs.
12. Reconnect the jack screws that you removed in Step 9, reconnect the three connectors that you removed in Step 8, and reinstall the PCB cover that you removed in Step 7.
13. Reattach the PCB module to the antenna frame using the module's four captive screws.
14. Reconnect the cables that you removed in Steps 4 and 5. Be sure to reconnect all cables in their proper positions. Figure 5-10 shows the proper connector assignments.

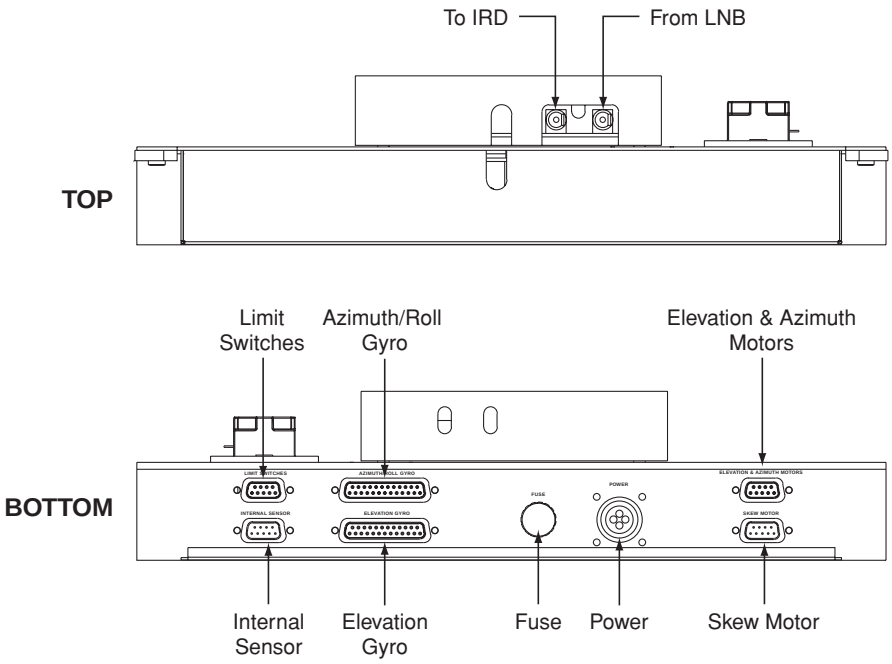


Figure 5-10
PCB Module Connectors

Make sure the cable jacket passes through the PCB cover's access slot within the rubber grommet to protect the wires from the edge of the PCB frame.

15. Apply power to the antenna unit.
16. Type **HALT<cr>** *(<cr> indicates a carriage return/ ENTER key)*.
17. Type **DEBUGON<cr>**.
18. Type **=TVG8<cr>**.
19. Type **=SERNUM,<serial number><cr>**, where <serial number> = the system serial number you recorded in Step 2.
20. Type **ZAP<cr>** to restart/reinitialize the system.

21. Calibrate the antenna gyros as explained in *"Calibrating the Gyros" on page 105*.

22. Reinstall your selected satellites as explained in *Section 2.7, "Installing Satellites Using the MCU," on page 42*.

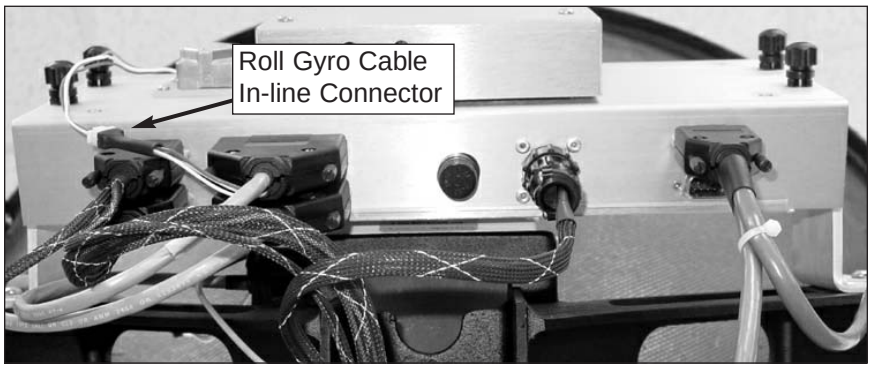
5.7 Replacing the RF PCB

1. Disconnect power from the antenna unit and the IRD.

The RF PCB is protected within a metal enclosure that is fastened to the antenna frame. This PCB module, which contains the main PCB and the RF PCB, must be removed to gain access to the RF PCB.

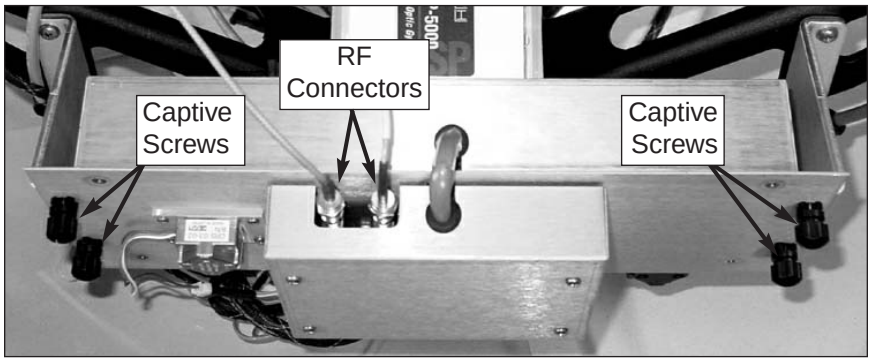
2. Disconnect all cables from the bottom of the PCB module, including the roll gyro cable at the in-line connector.

Figure 5-11
PCB Module Connectors (Bottom View)



3. Using a 7/16" wrench, **carefully** disconnect the RF cables from the top of the PCB module.

Figure 5-12
PCB Module Connectors (Top View)



4. Loosen the four captive screws securing the PCB module to the antenna frame. Remove the PCB module and bring it belowdecks for bench work.

5. Remove the four #6-32 screws and flat washers securing the RF PCB cover to the PCB module. Set aside the RF PCB cover.

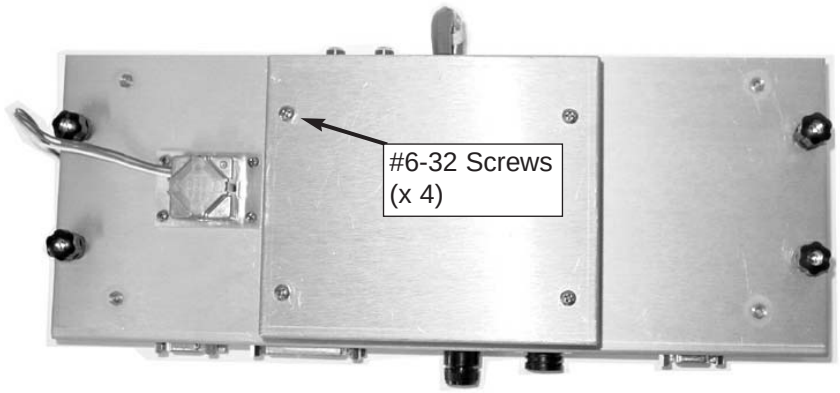


Figure 5-13
RF PCB Cover

6. Disconnect the Molex connector from the RF PCB.

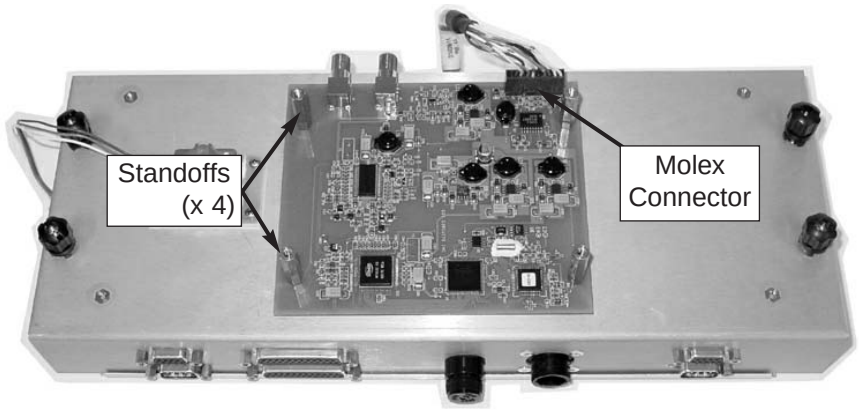
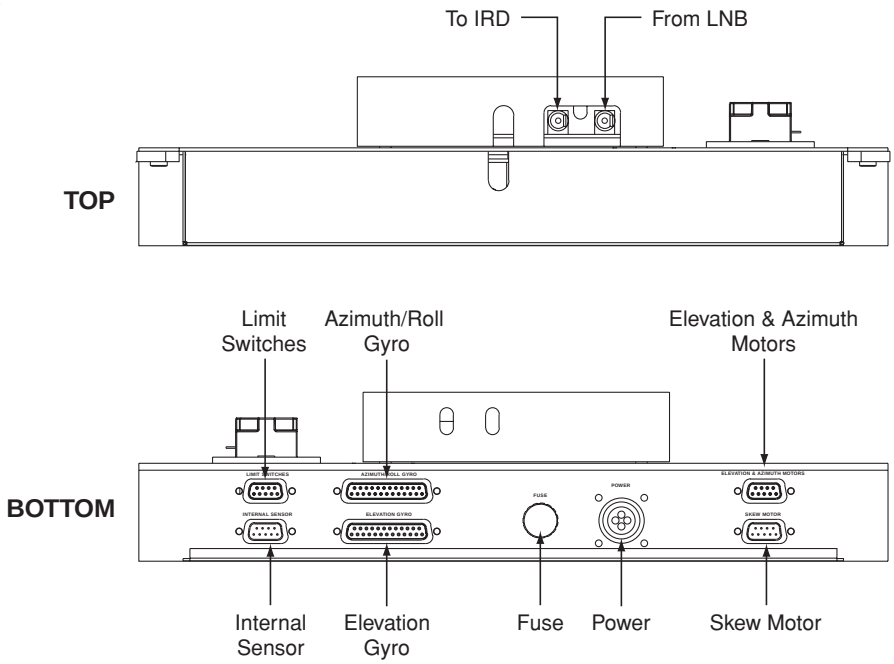


Figure 5-14
RF PCB

7. Using a ¼" nut driver/socket, remove the four #6-32 standoffs securing the RF PCB to the PCB module (see Figure 5-14). Remove the old RF PCB.
8. Apply a drop of Loctite threadlocker to the screw ends of the six standoffs and secure the new RF PCB to the PCB module with the standoffs.
9. Reconnect the Molex connector that you removed in Step 6, and reinstall the PCB cover that you removed in Step 5.
10. Reattach the PCB module to the antenna frame using the module's four captive screws.

11. Reconnect the cables that you removed in Steps 2 and 3. Be sure to reconnect all cables in their proper positions. Figure 5-15 shows the proper connector assignments.

Figure 5-15
PCB Module Connectors



5.8 Replacing the Internal Sensor

1. Disconnect the sensor cable from the internal sensor assembly.

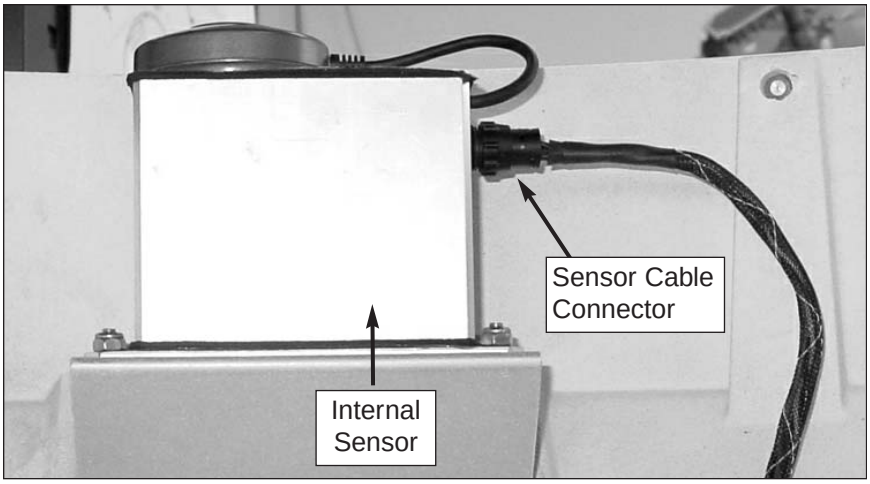
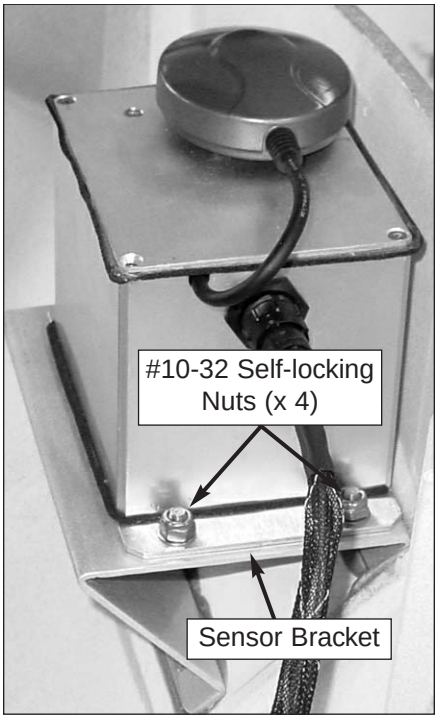


Figure 5-16
Internal Sensor Assembly (Side View)

2. Using a ⅜" nut driver/socket, remove the four #10-32 self-locking nuts and flat washers securing the internal sensor assembly to the sensor bracket. Remove the old internal sensor.
3. Install the new internal sensor. Secure in place with the nuts/washers that you removed in Step 2 and reconnect the sensor cable.
4. With Autocalibration set to "ON," the sensor will calibrate itself when you power up the antenna and maneuver the vessel. The factory default setting for Autocalibration is "ON" (see *"Selecting Autocalibration" on page 78*).

Figure 5-17
Internal Sensor Assembly (Top View)



5.9 Replacing the Azimuth FOG

1. Disconnect the gyro cable from the fiber optic gyro (FOG).

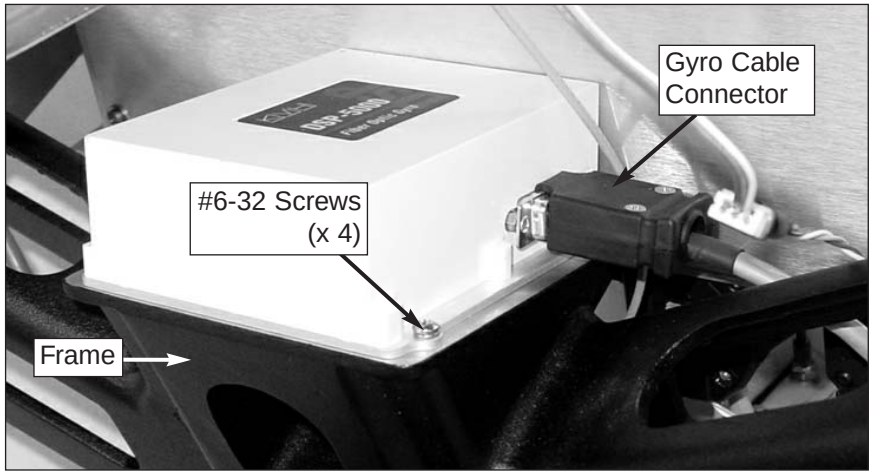


Figure 5-18
Azimuth FOG (Patented)

2. Remove the four #6-32 screws and flat washers securing the FOG to the antenna frame. Remove the old FOG.
3. Apply a drop of Loctite threadlocker to the threads of the screws that you removed in Step 2. Install the new azimuth FOG and secure in place with the screws/washers.
4. Reconnect the gyro cable that you removed in Step 1.
5. Calibrate the gyro as described in *"Calibrating the Gyros" on page 105*.

Calibrating the Gyros

To calibrate the azimuth, elevation, and roll gyros, follow the steps below.

1. With a PC connected to the MCU's maintenance port, apply power to the antenna unit.
2. Type **HALT<cr>** *(<cr> indicates a carriage return/ENTER key)* while the system is performing the limit switch initialization routine. The system will complete the initialization function by finding the azimuth and elevation switch limits and then go to the home position.
3. Type **DEBUGON<cr>** to enter the Debug Mode.
4. Type **EL,300<cr>.**
5. Using a digital level (or equivalent), measure and record the angle of the feed tube, as shown in Figure 5-19.
6. Type **=CALUP,XX.X<cr>**, where XX.X is the number you recorded in Step 5.
7. Using a digital level, measure and record the angle of the roll gyro on the PCB module, as shown in Figure 5-20.
8. Type **GYROANGLE,X.XX<cr>**, where XX.X is the number you recorded in Step 7.
9. Type **=CALGYRO<cr>.** Verify that the Antenna Gyro Azimuth scale factor is between -0.00090 and -0.00110 and the Antenna Gyro Elevation scale factor is between 0.00090 and 0.00110.
10. Type **ZAP<cr>** to restart/reinitialize the system.

Refer to Section 4.5, "Computer Diagnostics," on page 88 for complete details on connecting a PC to the system via the maintenance port.

Figure 5-19
Measuring Feed Tube Angle

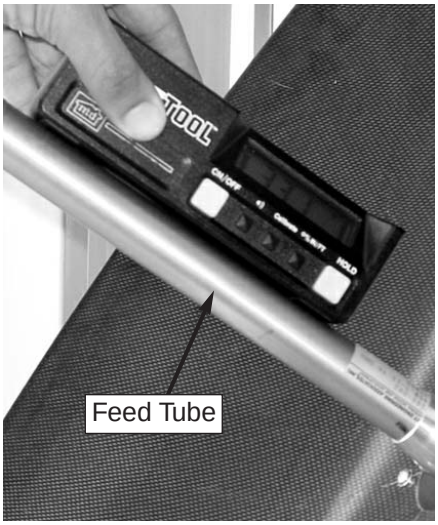
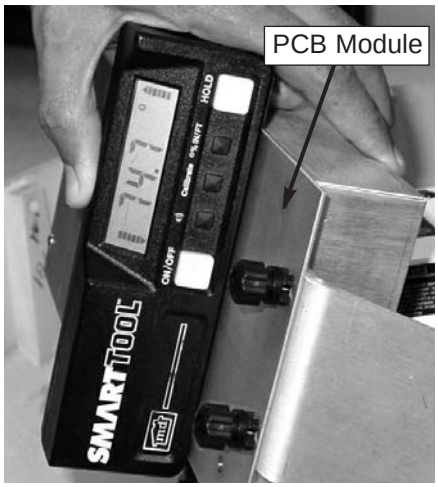


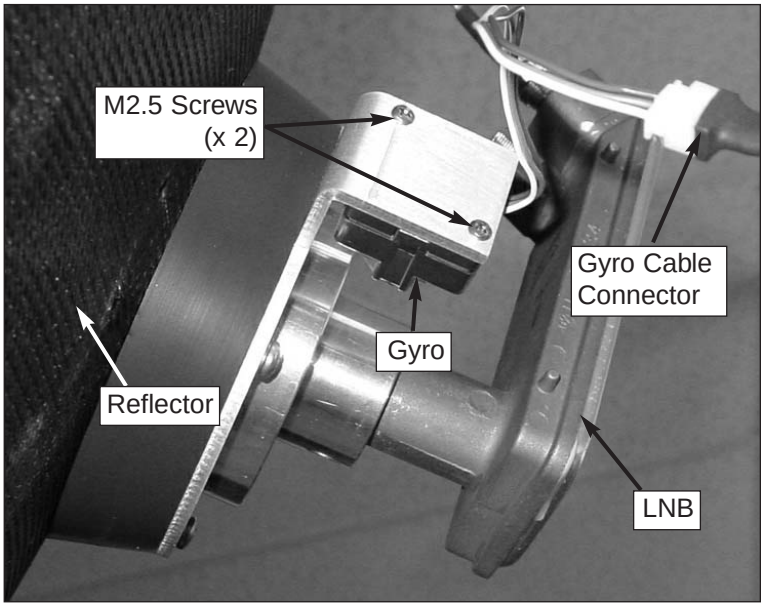
Figure 5-20
Measuring Roll Gyro Angle



5.10 Replacing the Elevation Gyro

1. Disconnect the gyro cable from the in-line connector.

Figure 5-21
Elevation Gyro



2. Remove the two M2.5 screws securing the gyro to the LNB/feed tube assembly. Remove the old gyro.
3. Apply a drop of Loctite threadlocker to the threads of the screws that you removed in Step 2. Install the new elevation gyro and secure in place with the two screws.
4. Connect the new gyro cable to the in-line connector that you disconnected in Step 1.
5. Calibrate the gyro as described in *"Calibrating the Gyros" on page 105*.

5.11 Replacing the Roll Gyro

1. Disconnect the gyro cable from the in-line connector.

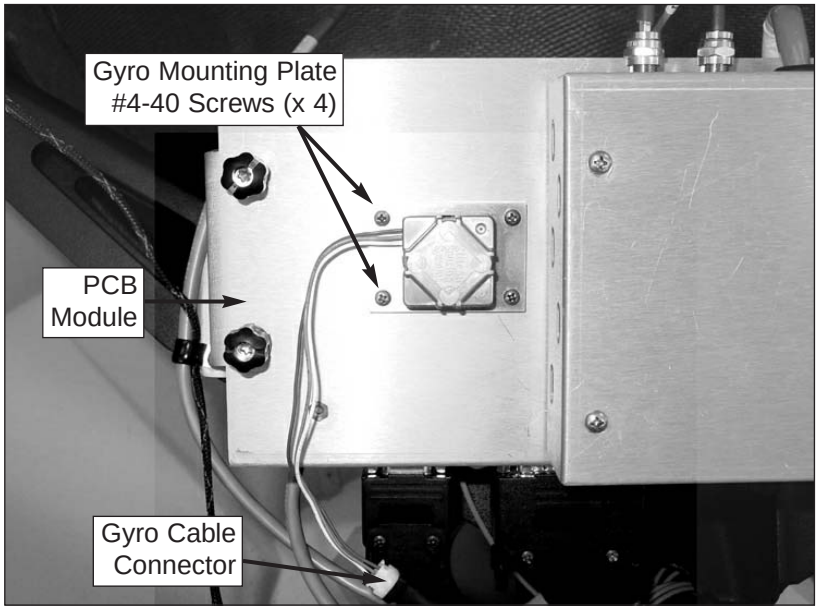


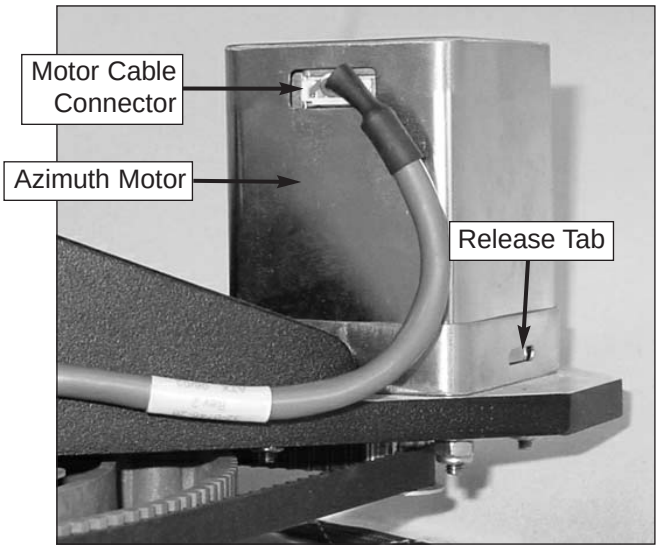
Figure 5-22
Roll Gyro

2. Remove the four #4-40 screws and flat washers securing the gyro mounting plate to the PCB module.
3. Remove the two M2.5 screws securing the gyro to the gyro mounting plate. Remove the old gyro.
4. Apply a drop of Loctite threadlocker to the threads of the M2.5 screws that you removed in Step 3. Install the new roll gyro onto the mounting plate and secure in place with the two M2.5 screws.
5. Apply a drop of Loctite threadlocker to the threads of the #4-40 screws that you removed in Step 2. Reattach the gyro mounting plate to the PCB module using the #4-40 screws.
6. Connect the new gyro cable to the in-line connector that you disconnected in Step 1.
7. Calibrate the gyro as described in *"Calibrating the Gyros" on page 105*.

5.12 Replacing the Azimuth Motor

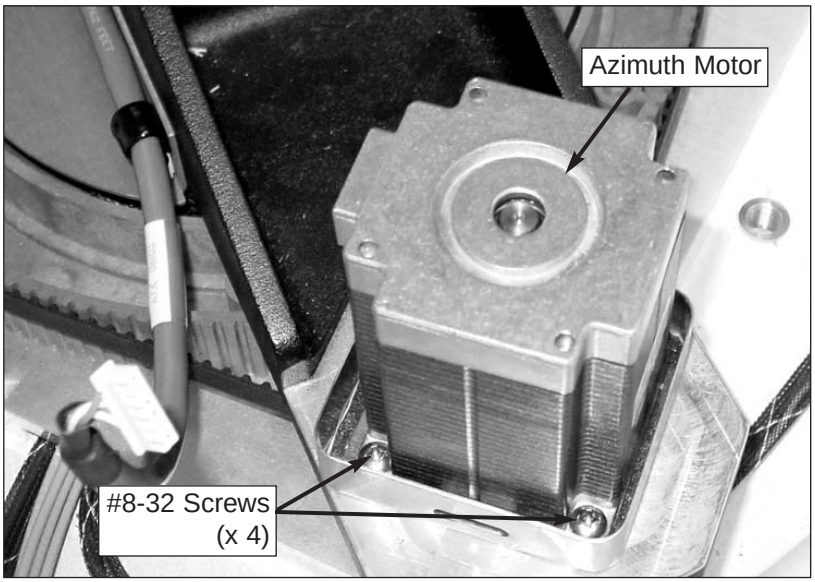
1. Disconnect the motor cable from the azimuth motor.

Figure 5-23
Azimuth Motor Cable



2. Remove the motor shield by pressing on the two sides of the shield above the release tabs.
3. Remove the four #8-32 screws, locking nuts, and washers securing the motor to the antenna frame. Remove the old azimuth motor.

Figure 5-24
Azimuth Motor (Shield Removed)



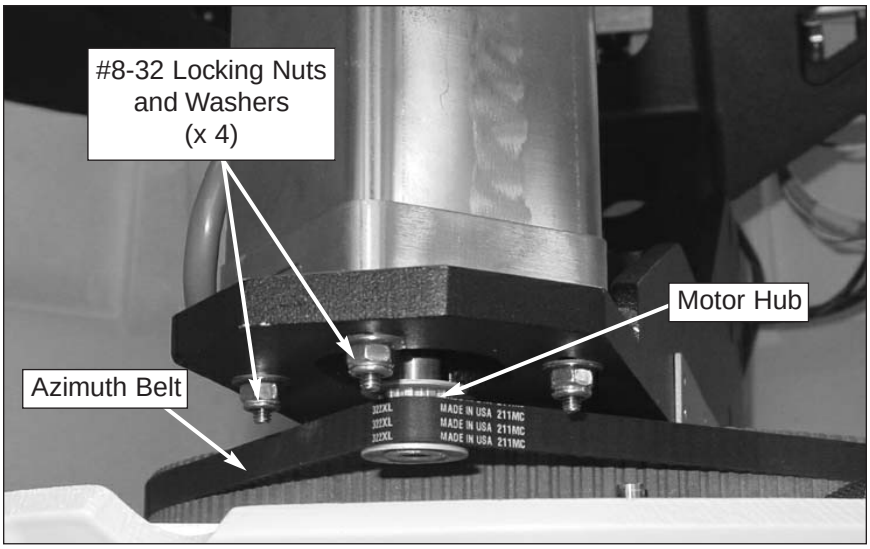


Figure 5-25
Azimuth Motor and Belt

4. Install the new azimuth motor with the belt positioned around the outer lip of the motor hub (see Figure 5-25). Reinstall the screws, washers, and locking nuts that you removed in Step 3, but do not tighten them yet.

5. Slide the motor to adjust the belt tension for a maximum of ⅛" (3 mm) deflection with moderate finger pressure between the motor hub and antenna pulley. Tighten the screws and locking nuts using an 11/32" nut driver/socket. *Some readjustment may be necessary if the belt tension results in excessive vibration.*

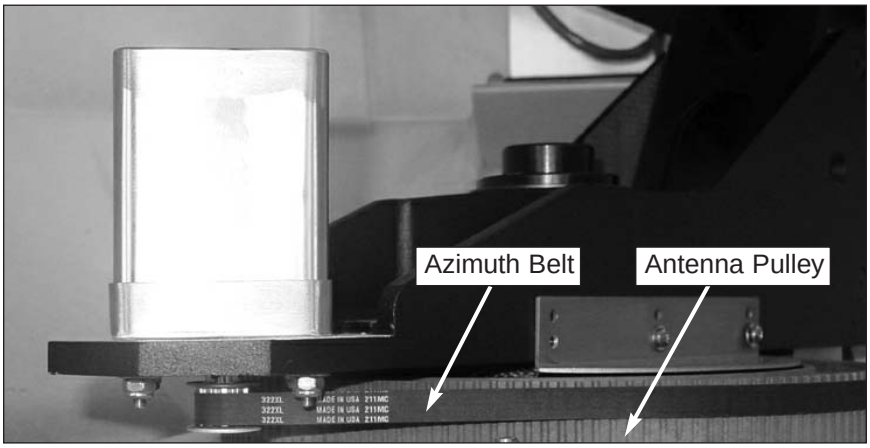


Figure 5-26
Azimuth Belt

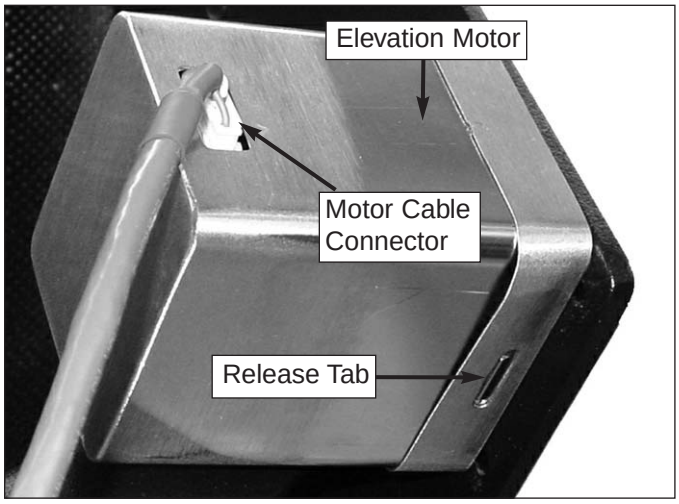
6. Reinstall the shield that you removed in Step 2.

7. Reconnect the motor cable that you removed in Step 1.

5.13 Replacing the Elevation Motor

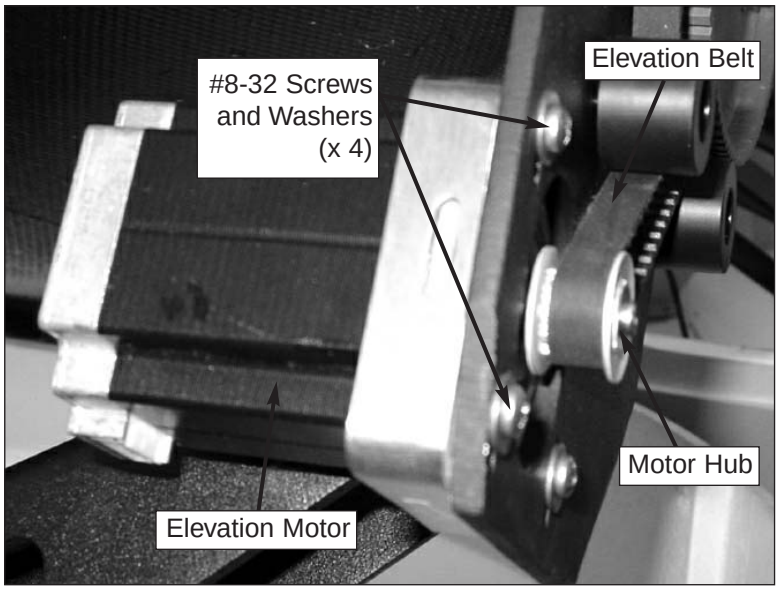
1. Disconnect the motor cable from the elevation motor.

Figure 5-27
Elevation Motor Cable



2. Remove the motor shield by pressing on the two sides of the shield above the release tabs.
3. Remove the four #8-32 screws and washers securing the motor to the antenna frame. Remove the old elevation motor.

Figure 5-28
Elevation Motor (Shield Removed)



4. Install the new elevation motor with the belt positioned around the outer lip of the motor hub. Reinstall the screws and washers that you removed in Step 3, but do not tighten them yet.

5. Slide the motor to adjust the belt tension for a maximum of ⅛" (3 mm) deflection with moderate finger pressure between the motor hub and antenna pulley. Tighten the screws. *Some readjustment may be necessary if the belt tension results in excessive vibration.*

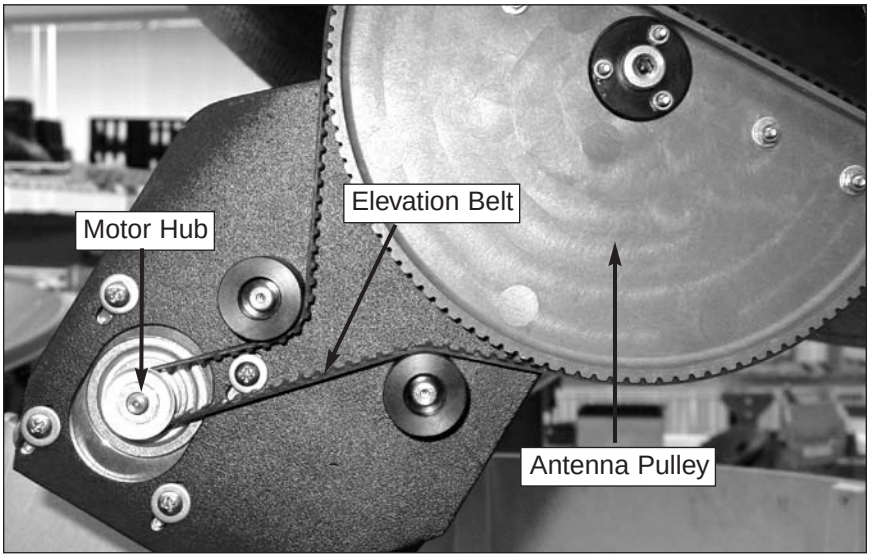


Figure 5-29
Elevation Belt

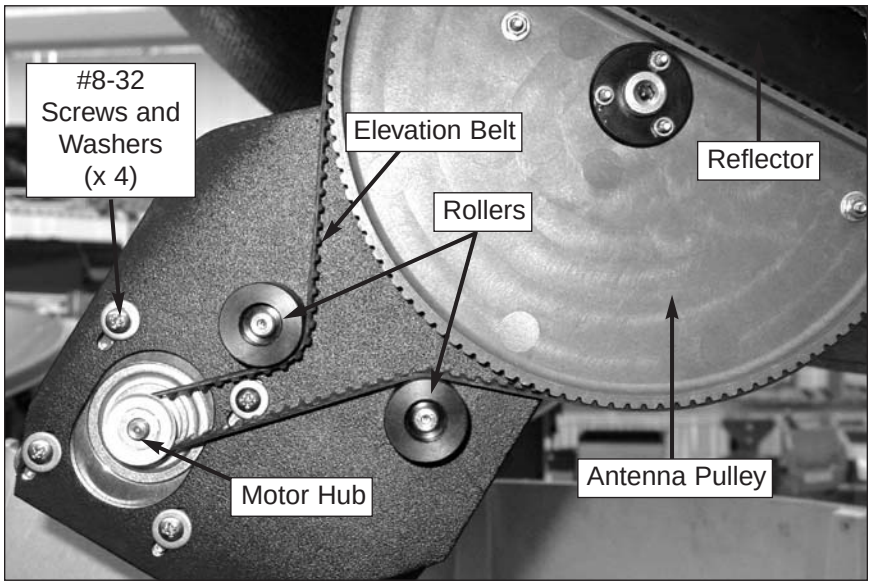
6. Reinstall the shield that you removed in Step 2.

7. Reconnect the motor cable that you removed in Step 1.

5.14 Replacing the Elevation Belt

1. Loosen (do not remove) the four #8-32 screws securing the motor to the antenna frame until the motor is free to slide upward. Raise the motor to the top of the slots and retighten the screws to hold it in place.

Figure 5-30
Elevation Belt



2. Roll the belt over the motor hub, then over the antenna pulley. Discard the old belt.
3. Carefully work the new belt around the antenna pulley, between the rollers, and around the motor hub. Ensure that the teeth are on the inside of the belt. Once the belt is in place, work it back and forth to ensure that the belt is aligned and the teeth are engaged with the pulley.
4. Loosen the #8-32 screws and slide the motor downward until the belt is set at the proper tension. Adjust the belt tension for a maximum of ⅛" (3 mm) deflection with moderate finger pressure between the motor hub and the antenna pulley. *Some readjustment may be necessary if the belt tension results in excessive vibration.*
5. Tighten the screws.

5.15 Replacing the Skew Motor *(European Systems Only)*

1. Using a 7⁄16" wrench, carefully disconnect the four RF cables from the LNB.

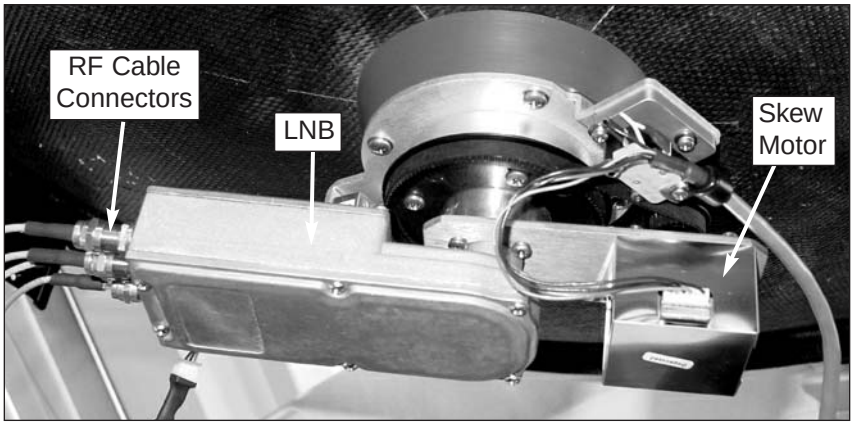


Figure 5-31
European LNB/Feed Tube Assembly

2. Disconnect the elevation gyro cable from the in-line connector.

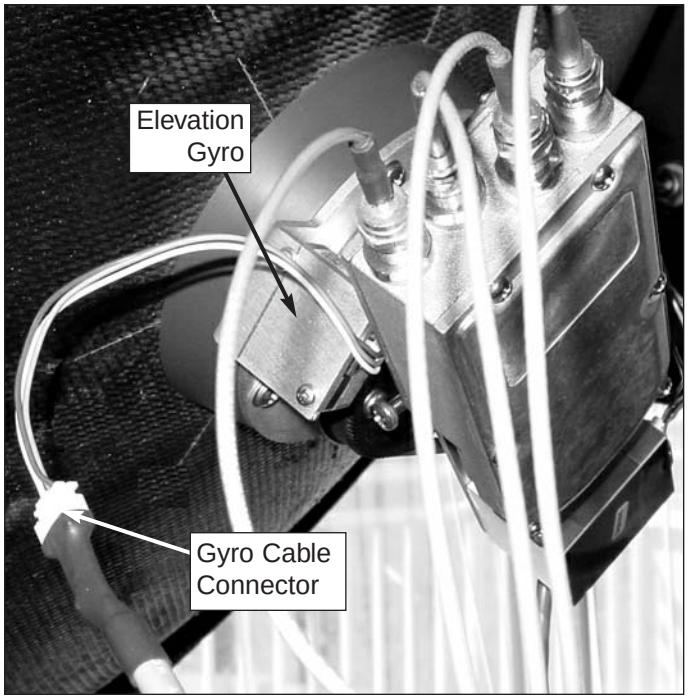


Figure 5-32
Elevation Gyro Cable

3. Disconnect the skew motor cable from the PCB module.

Figure 5-33
Skew Motor Cable Connector on PCB Module

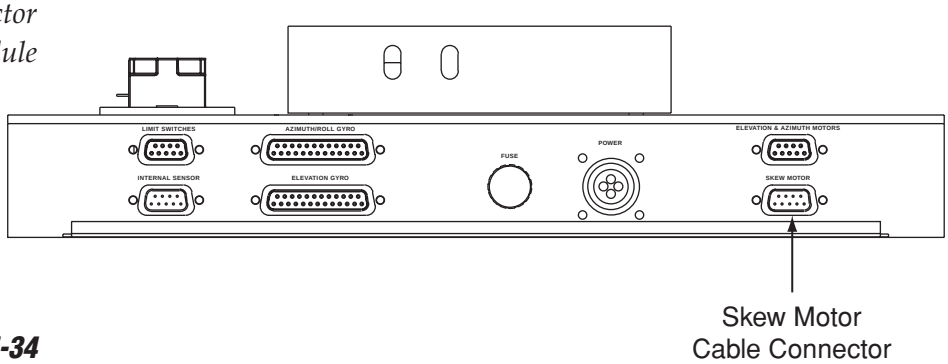
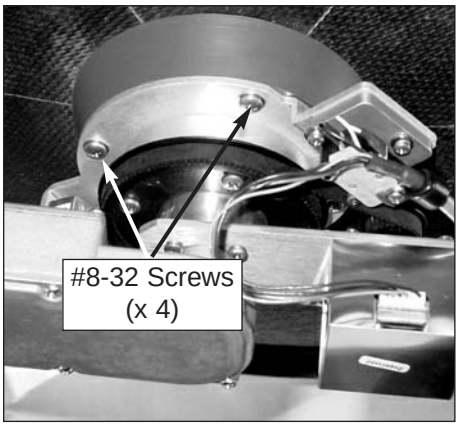


Figure 5-34
Removing the LNB/ Feed Tube Assembly



4. Remove the four #8-32 screws securing the LNB/feed tube assembly to the reflector base (see Figure 5-34). Withdraw the LNB/feed tube assembly through the center hole in the reflector.

5. Disconnect the motor cable from the skew motor.

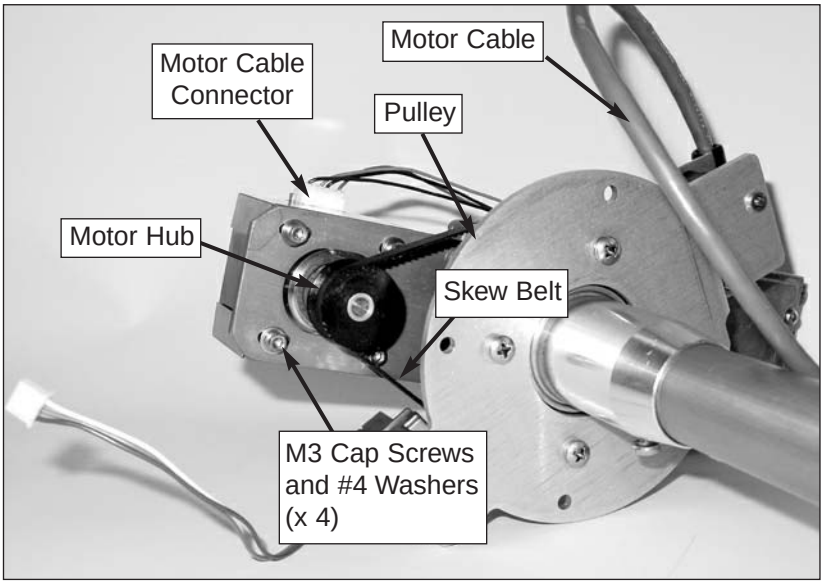


Figure 5-35
Skew Motor and Belt

6. Using a 2.5 mm allen wrench, remove the four M3 cap screws and #4 washers securing the motor to the LNB/feed tube assembly (see Figure 5-35). Remove the old skew motor.

7. Gently extend the two sides of the motor shield and remove the shield from the old skew motor.

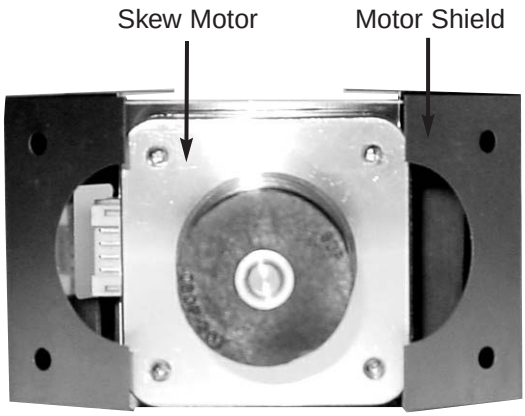


Figure 5-36
Removing the Skew Motor Shield

8. Place the new skew motor inside the motor shield. The motor's connector should pass through the small opening in the shield.

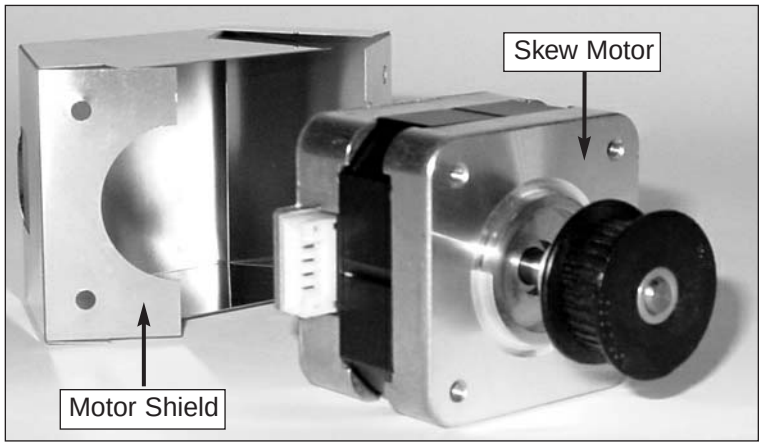


Figure 5-37
Installing the Skew Motor Shield

9. Attach the new skew motor to the LNB/feed tube assembly with the belt positioned around the outer lip of the motor hub. Ensure that the motor's connector is facing the motor cable, as shown in Figure 5-35. Reinstall the washers and screws that you removed in Step 6, but do not tighten them yet.

10. Slide the motor to adjust the belt tension until the belt teeth fully engage the motor hub and the pulley. Tighten the motor cap screws. *Some readjustment may be necessary if the belt tension results in excessive vibration.*

11. Reconnect the motor cable that you removed in Step 5.
12. Apply a small amount of Loctite threadlocker to the threads of the four #8-32 screws that you removed in Step 4.
13. Carefully reattach the LNB/feed tube assembly to the antenna reflector and secure in place with the four #8-32 screws.
14. Reconnect the cables that you removed in Steps 2 and 3.
15. Using a 7/16" wrench, carefully reattach the RF cables to the LNB.

5.16 Replacing the Skew Belt *(European Systems Only)*

1. Using a 7⁄16" wrench, carefully disconnect the RF cables from the LNB.

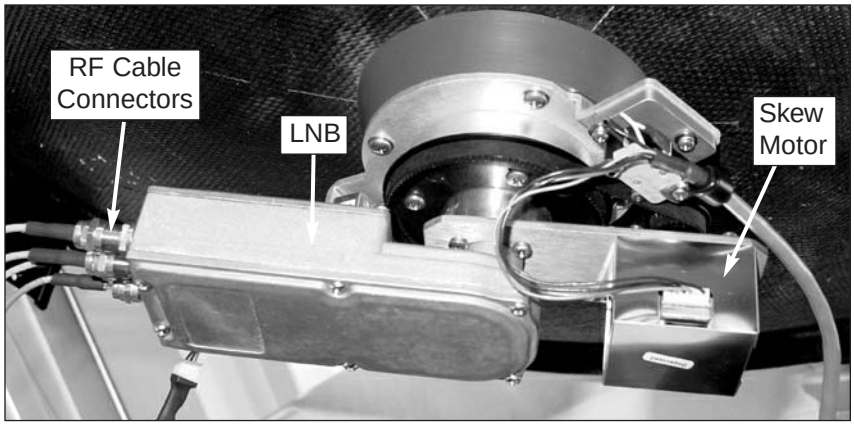


Figure 5-38
European LNB/Feed Tube Assembly

2. Disconnect the elevation gyro cable from the in-line connector.

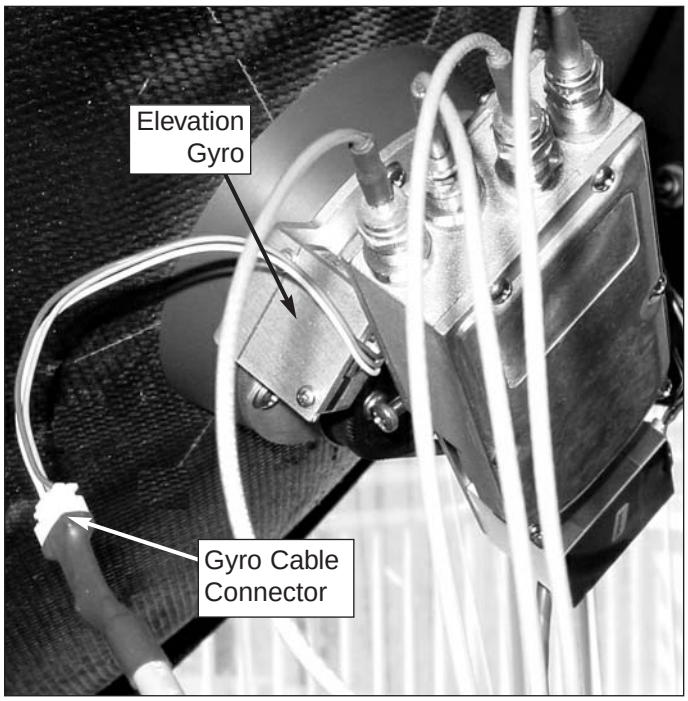


Figure 5-39
Elevation Gyro Cable

3. Disconnect the skew motor cable from the PCB module.

Figure 5-40
Skew Motor Cable Connector on PCB Module

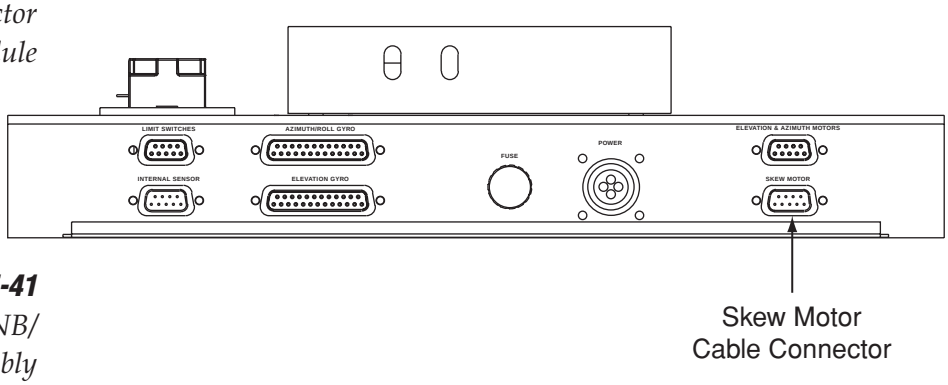
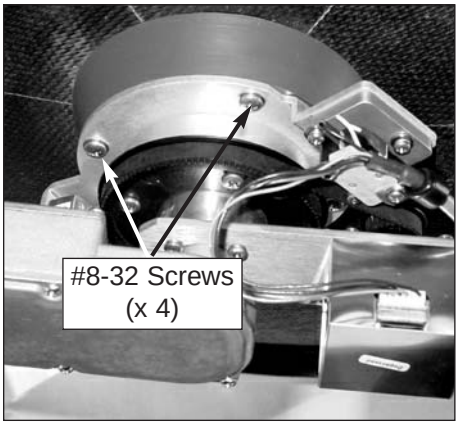


Figure 5-41
Removing the LNB/ Feed Tube Assembly



4. Remove the four #8-32 screws securing the LNB/feed tube assembly to the reflector base (see Figure 5-41). Withdraw the LNB/feed tube assembly through the center hole in the reflector.

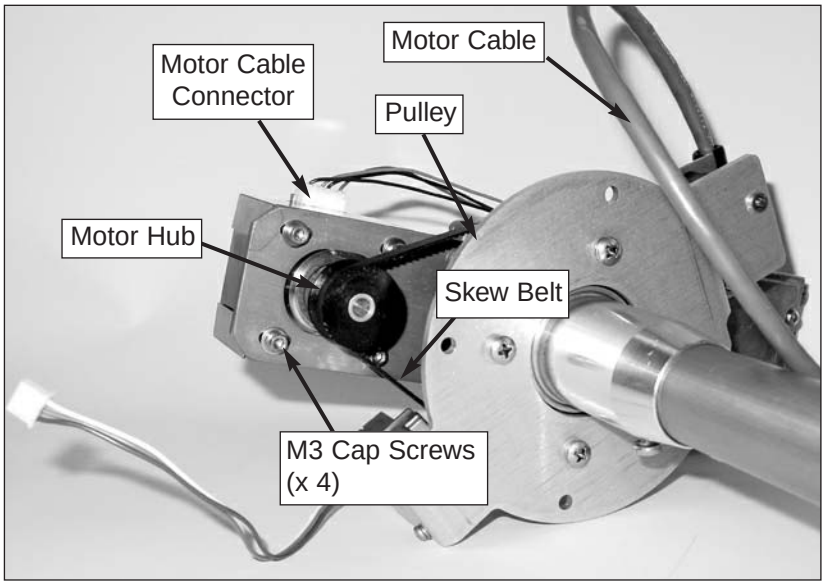


Figure 5-42
Skew Motor and Belt

5. Using a 2.5 mm allen wrench, loosen (do not remove) the four M3 cap screws securing the motor to the bracket until the motor is free to slide back and forth (see Figure 5-42). Slide the motor toward the pulley to loosen the belt.
6. Roll the belt over the motor hub, then over the pulley. Remove and discard the old belt.
7. Place the new belt around the pulley and around the motor hub. Ensure that the teeth are on the inside of the belt.

8. Slide the motor back until the belt is set at the proper tension. Adjust the belt tension until the belt teeth fully engage the motor hub and the pulley. *Some readjustment may be necessary if the belt tension results in excessive vibration.*

9. Once the belt is at the proper tension, tighten the motor's four M3 cap screws.

10. Apply a small amount of Loctite threadlocker to the threads of the four #8-32 screws that you removed in Step 4.

11. Carefully reattach the LNB/feed tube assembly to the antenna reflector and secure in place with the four #8-32 screws.

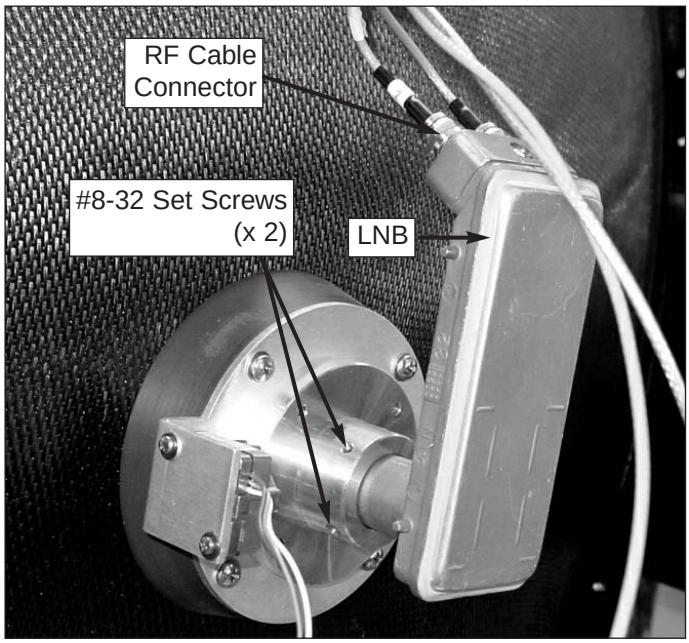
12. Reconnect the cables that you removed in Steps 2 and 3.

13. Using a 7/16" wrench, carefully reattach the RF cables to the LNB.

5.17 Replacing the LNB

1. Using a 7/16" wrench, carefully disconnect the RF cables from the LNB. (Figure 5-43 shows a North American-style LNB; Figure 5-38 on page 117 shows a European-style LNB).

Figure 5-43
North American-style LNB



2. Using a 5/64" allen key, loosen the two #8-32 set screws securing the LNB in place. Remove the old LNB.
3. Install the new LNB and secure in place with the #8-32 set screws.
4. Using a 7/16" wrench, carefully reattach the RF cables that you removed in Step 1.

5.18 Replacing the LNB/Feed Tube Assembly

1. Using a 7⁄16" wrench, carefully disconnect the RF cables from the LNB. (Figure 5-44 shows a North American-style LNB; Figure 5-38 on page 117 shows a European-style LNB).

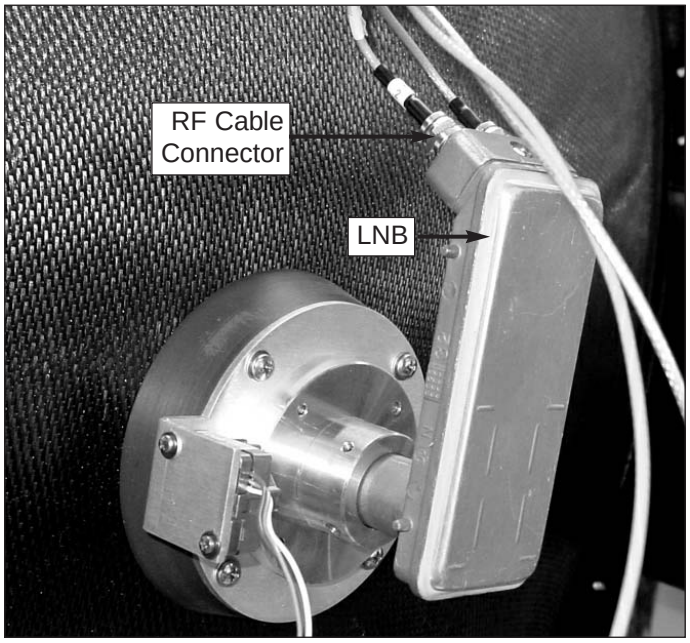


Figure 5-44
North American-style LNB

2. Disconnect the elevation gyro cable from the in-line connector.

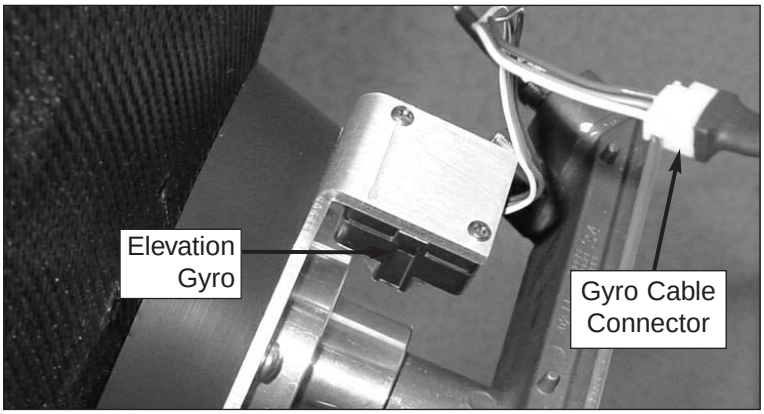


Figure 5-45
Elevation Gyro Cable

Figure 5-46
Skew Motor Cable Connector on PCB Module

3. ***European systems only:***
Disconnect the skew motor cable from the PCB module (see Figure 5-46).

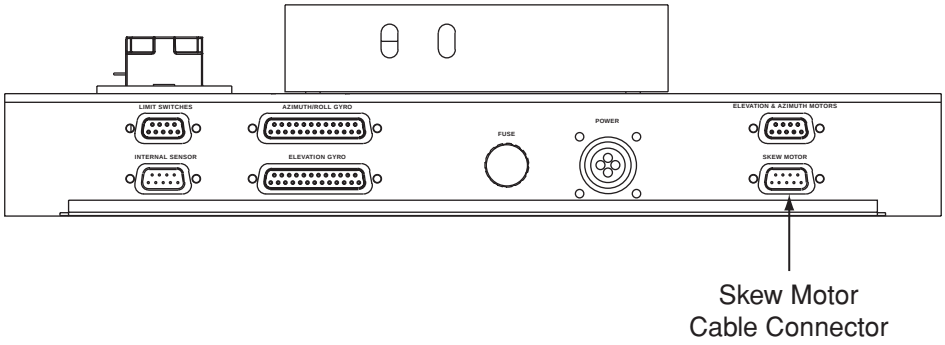
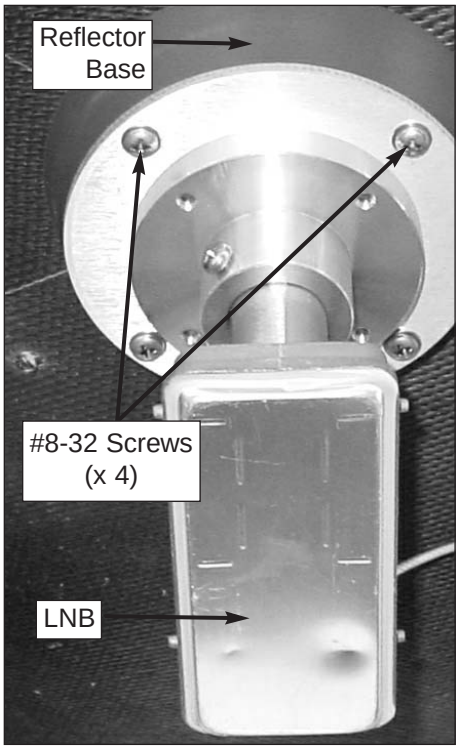


Figure 5-47
LNB/Feed Tube Assembly



4. Remove the four #8-32 screws securing the LNB/feed tube assembly to the reflector base (see Figure 5-47). Carefully withdraw the LNB/feed tube assembly through the center hole in the reflector.
5. Apply a small amount of Loctite threadlocker to the threads of the four #8-32 screws that you removed in Step 4.
6. Install the new LNB/feed tube assembly and secure in place with the #8-32 screws.
7. Reconnect the cables that you removed in Steps 2 and 3.
8. Using a 7⁄16" wrench, carefully reattach the RF cables to the LNB.

5.19 Preparing for Shipment

If you need to repack the antenna unit for shipment, the shipping restraint that you removed during installation must be reattached. Follow the steps below to reinstall the restraint and get the antenna unit ready for shipping.

1. Using a heavy-duty tie-wrap *(which you detached at the time of installation)*, secure the antenna frame to the internal sensor's mounting bracket.

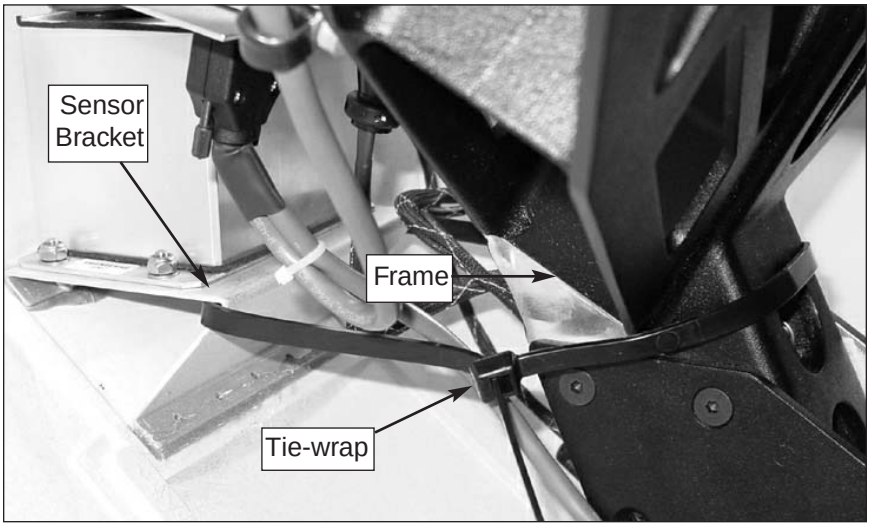


Figure 5-48
Azimuth Shipping Restraint

2. Place some foam between the reflector and the baseplate to keep the reflector from moving.
3. Pack the TracVision G8 antenna unit in its original package. Secure the box to a pallet to ensure upright transport.
4. As detailed in the warranty accompanying this product and printed on the last page of this manual, a Return Material Authorization (RMA) number is required prior to the return of the TracVision G8 system to KVH. Contact the KVH Technical Support Department at +1 401 847-3327 or via e-mail at **techs@kvh.com** to obtain the RMA number. Please review your warranty to familiarize yourself with all requirements, liabilities, and policies.

When rotating the azimuth mechanism by hand, go slowly! Hitting the mechanical stops with excessive force will damage the azimuth limit switch.

KVH is not liable for damage caused by improper shipping.

Before returning the product, be sure to obtain an RMA number from KVH's Technical Support Department and write the number on the outside of the box. Shipments received without an RMA number will be returned to you at your expense.

Appendices

This section contains several appendices of supplemental information, including a mounting template, wiring diagram, and parser commands.

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Appendix A
System Specifications

A.1 Antenna Specifications

Physical Characteristics

Antenna Unit	39" (99 cm) h x 35" (89 cm) dia; 85 lbs (38.6 kg)
MCU	7.3" (18.5 cm) d x 8.2" (20.8 cm) w x 2.6" (6.6 cm) h
Operating temperature	-13°F to +130°F (-25°C to +55°C)
Storage temperature	-40°F to +185°F (-40°C to +85°C)

Table A-1
TracVision G8 Antenna Physical Specifications

Input Power

Input	9-36 VDC, 120 W (floating)

Table A-2
TracVision G8 Power Specifications

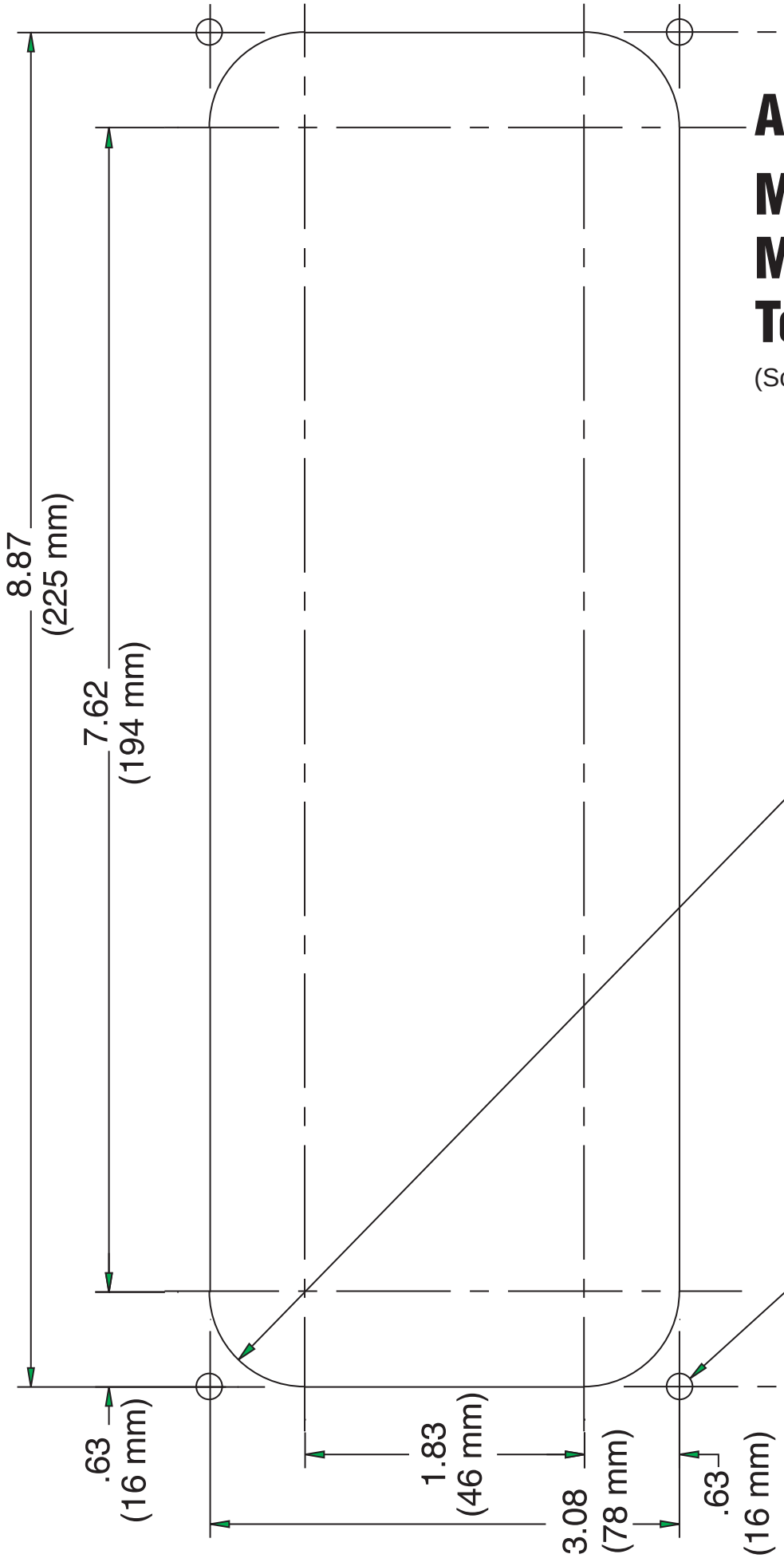
Antenna System Performance

Minimum EIRP	44 dBW
Elevation range	-15° to +85°
Azimuth range	720°
Tracking rate	30°/second
Position repeatability	0.1°
Skew control	Automatic
GPS	Internal
Antenna dish	32" (82 cm) dia
Standard LNB	*North America and Latin America:* Dual-output circular polarized *Europe:* Quad-output linear polarized with independent outputs
Surge/sway/heave	±0.2 G
Shock	20 G, 11 msec
Vibration	0.9 G rms over 5-33 Hz

Table A-3
TracVision G8 Performance Specifications

Appendix B
MCU Flush Mount Panel Template

(Scale 1:1)



Appendix C
Comprehensive System Wiring Diagram

The comprehensive TracVision G8 wiring diagram is unavailable in PDF format. If you require a copy of this wiring diagram, please contact KVH Technical Support at +1 401 847-3327 or via email at techs@kvh.com. A copy of the diagram can be mailed or faxed to you upon request.

Appendix D
Startup Data Sequences

The data on the following pages presents a sample startup data sequence registered by the TracVision G8. These sequences may vary based on the software version loaded onto the TracVision G8 system. This data can be recorded using the data port and a PC.

```
TracVision G8 Controller Rev X - Ver X.XX - Serial number XXXXXXXX - HW Rev XX
*** Init RF Board ***
RF: S,A,H,U,V
RF: SATINSTALL,55,C,57,C
RF: L,A----------------------------------------Identifies Satellite A or B as currently
RF: SATCONFIG                                    loaded for acquisition
RF: F,A,12368,20000,67,0xFFFE,R,U,2-------------Satellite Configuration Data, Satellite A
RF: F,A,12368,20000,67,0xFFFE,R,U,2
RF: F,A,12238,20000,67,0xFFFE,L,U,2
RF: F,A,12238,20000,67,0xFFFE,L,U,2
RF: F,B,12370,20000,56,0x1004,R,U,3-------------Satellite Configuration Data, Satellite B
RF: F,B,12370,20000,56,0x1004,R,U,3
RF: F,B,12326,20000,56,0x1004,L,U,3
RF: F,B,12326,20000,56,0x1004,L,U,3
RF: RF PCB Version X.X--------------------------Current RF software revision
RF COMM: PASS-----------------------------------PASS is expected
RF: DVB/DSS 5
*** Init Antenna ***
*** NO GPS-Default Used ***----------------------GPS has no lock upon power-up
GPS(DEFAULT),41,N, 71,W,083000.00
GPS: DSS_101 AZ = 220.8, EL = 33.4
GPS: DSS_119 AZ = 238.9, EL = 22.1
Saved Position: DSS_101 AZ = 232.2, EL = 37.7
Saved Position: DSS_119 AZ = 250.3, EL = 26.4
*** Limit Switch Test ***
Limit Switch Status: PASS-----------------------PASS is expected
*** Init Sensor ***
AZ FOG: PASS------------------------------------PASS is expected
Sensor Status = @@
CAL SCORE = 100---------------------------------Confirmed data from internal sensor
SENSOR: PASS------------------------------------PASS is expected
*** Init Rate Bias ***
RF: First lock----------------------------------Indicates satellite found that has the
RF: S,A,H,U,V                                    frequency, symbol rate, and FEC code
BIAS/RF: 2056 2134 2577                          of the selected satellite
BIAS/RF: 2082 2053 2584
BIAS/RF: 2092 1990 2564
BIAS/RF: 2086 2029 2573
```

```
BIAS/RF: 2065 2082 2543
BIAS/RF: 2057 2185 2583
BIAS/RF: 2032 2146 2572
Check cal gyro to rate bias
BiasLimit =    8.00 BiasFOGLimit =    0.0003 BiasCorrection =    5.00
Gyro Bias: Az = 2069.15, Cal Az = 2067.98 -------Expected range is 1700-2300
Gyro Bias: El = 2050.04, Cal El = 2049.54
Gyro Bias: Az = 2069.15, El = 2050.04, Az FOG =    0.000300
Gyro Uncertainty: Az =    3.00, El =    3.00
GPS(ACTIVE),41.52,N, 71.28,W, 083000.00----------GPS position data (latitude, longitude, UTC)
GPS: DSS_101 AZ = 259.4, EL = 34.1 --------------Calculated satellite position based on GPS
*** Entering Tracking ***
+POS: 351.2  37.2 2531
%PRY:   1.2  -2.1 242.4 ------------------------Internal sensor data (pitch, roll, and yaw)
*** Network ID Check ***------------------------Comparing the tracked satellite's network ID to
RF: Normalize for AGC level changes                 the selected satellite's network ID
+POS: 351.2  36.8 2554
%PRY:   1.4  -2.2 242.3
RF: Y,0xFFFE-------------------------------------Indicates positive satellite identification
*** Tracking DSS_101 ***------------------------Identifies satellite currently tracked
Avg:  37.6   0.0   0.0   0.0   0.0                (TV broadcast image should be available)
Set con radius to 0.250 and 0.250
RF: IGNORE ID,0x0000
+POS: 352.0  35.8 2634
%PRY:   1.2  -2.2 242.2
Avg:  37.6  37.1  36.9  36.5  37.0
Saved Sat Pos: AZ =  233.0, EL =  37.0
+POS: 351.9  36.2 2606
%PRY:   1.2  -1.8 242.2
Rate Bias (Before): Az = 2.0692e+03 EL = 2.0500e+03
Rate Bias (After): Az = 2.0692e+03 EL = 2.0500e+03
Gyro Bias Residue: Az = -1.7217e-01 EL = 2.8887e-01
+POS: 352.0  36.1 2600
%PRY:   1.6  -2.3 242.3
+POS: 351.5  35.8 2576
%PRY:   1.2  -2.2 242.2
Conscan=>sleep: sat in  1.75 deg window.
+POS: 351.8  35.9 2611
%PRY:   1.2  -1.9 242.2
Sleeping
Old Gyro Bias: Az = 2069.20 EL = 2049.97
New Gyro Bias: Az = 2069.37 EL = 2049.68
RF: AGC=58792
Avg:  36.7  37.1  36.9  36.5  37.0
Saved Sat Pos: AZ =  232.6, EL =  36.9
+POS: 351.8  35.9 2610
%PRY:   1.2  -2.0 242.4
```

Appendix E
Maintenance Port Parser Commands

The TracVision G8 system parser commands are parsed when the system receives an ASCII carriage return (Hex 0D). An ASCII line feed (Hex 0A) is permitted but is ignored in any transmitted command. All system responses are terminated with an ASCII carriage return followed by a line feed and ending with either an acknowledge character (ASCII > (Hex 3E)) or a not-acknowledge character (ASCII ? (Hex 3F)). The parser commands are shown below in boldface capital letters but they are not case-sensitive. In most cases, the command is responded to with an echo; that is, if you type **ZAP**, for example, and press "ENTER" the response will be the command you have entered. For other commands, the response is specific for each command, such as **VERSION**, **STATUS** or **HELP**.

E.1 System Commands

Table E-1
System Commands

Software Version

Function:	reports software version and system type
Command:	**VERSION**
Argument:	none
Response:	KVH TVG8 Rev X - Version X.XX - XXX Motors

System Status Report

Function:	reports general system status
Command:	**STATUS**
Argument:	none
Response:	system status string

Initialize/Restart the System

Function:	initializes the system (perform a soft reset)
Command:	**ZAP**
Argument:	none
Response:	echoes the command, then reinitializes the system

Help on Parser Commands

Function:	lists parser commands
Command:	**HELP**
Argument:	none
Response:	print a list of all parser commands

Calculate Skew Angle

Function:	report skew angle of the current satellite
Command:	**SKEWANGLE**
Argument:	none
Response:	SKEW ANGLE = XXXX.X

E.2 Manual Positioning Commands

To execute the following commands, first put the antenna unit in idle mode by typing **HALT** and pressing "ENTER." Positioning commands may be entered after the antenna comes to rest.

Table E-2
Manual Positioning Commands

Azimuth Angle

Function:	commands a manual azimuth angle that the mechanism moves to
Command:	**AZ,xxxx** (range is 0000-3599)
Argument:	desired azimuth angle of the mechanism relative to external magnetic reference, or baseplate fwd, 000°-359.9°
Response:	echoes the command; mechanism moves at a fixed velocity

Elevation Angle

Function:	commands a manual elevation angle that the mechanism moves to
Command:	**EL,xxx** (range is 100-850)
Argument:	desired elevation angle of the mechanism relative to up, or external sensor attitude reference, 10.0°-85.0°
Response:	echoes the command; mechanism moves at a fixed velocity

Azimuth CW Step

Function:	commands a 0.1 deg CW manual step in azimuth angle
Command:	**6**
Argument:	none
Response:	echoes the command

Azimuth CCW Step

Function:	commands a 0.1 deg CCW manual step in azimuth angle
Command:	**4**
Argument:	none
Response:	echoes the command

Elevation UP Step

Function:	commands a 0.1 deg UP manual step in elevation angle
Command:	**8**
Argument:	none
Response:	echoes the command

Elevation DOWN Step

Function:	commands a 0.1 deg DOWN manual step in elevation angle
Command:	**2**
Argument:	none
Response:	echoes the command

E.3 Operational Commands

Tracking Mode

Function:	starts active tracking of the satellite
Command:	**TRACK**
Argument:	none
Response:	echoes the command

Table E-3
Operational Commands

Idle Mode

Function:	halts active tracking and conical scan, then enters idle mode
Command:	**HALT**
Argument:	none
Response:	echoes the command

Current Cable Wrap Angle

Function:	sets or reports current cable wrap angle, defined as 0° (CCW limit) to 700° (CW limit); the value is expressed as 0000-7000 with an implied decimal
Command:	**WRAPANGLE,xxxx**
Argument:	the desired cable wrap angle setting
Response:	Wrap Angle = xxxx

E.4 Tracking and Conical Scan Commands

Table E-4
Tracking and Conical Scan Commands

Target Location

Function:	reports the target location in antenna frame. Data format is E### for elevation in degrees 000-900 and A#### for azimuth in degrees 0000-3599 with implied decimals
Command:	**TGTLOCATION**
Argument:	none
Response:	Target Location = A = E###, A#### B = E###, A####

Analog Signal Strength Report

Function:	reports signal strength from RF detector circuit in A/D counts (000-FFF Hex)
Command:	**SIGLEVEL**
Argument:	none
Response:	Signal Strength = xxxx

E.5 Sensor Module Commands

Table E-5
Sensor Module Commands

Report Platform Attitude

Function:	reports vessel attitude indicated by sensor module
Command:	**ATTITUDE**
Argument:	none
Response:	Pitch +/-pp.p, Roll +/-rr.r, Yaw yyy.y

Compass Calibration Score

Function:	reports compass calibration score
Command:	**CALSCORE**
Argument:	none
Response:	Cal Score = xxx

Compass Calibration Enable

Function:	enables the sensor module compass calibration
Command:	**CALON**
Argument:	none
Response:	echoes the command

Compass Calibration Disable

Function:	disables the sensor module compass calibration
Command:	**CALOFF**
Argument:	none
Response:	echoes the command

E.6 RF Board Commands

Table E-6
RF Board Commands

Serial Communications, Status/Polarization Report, Tone Changes

Function:	start serial communications, reports status & polarization/tone changes
Command:	**@S**
Response:	S,s,p,b,m <cr> every 5 seconds until ><cr>is returned from system software
Where:	s = Satellite (a = Primary, b = Secondary) p = Polarization (v = Vertical, h = Horizontal, r = Right, l = Left, x = No LNB Power) b = Band (h = High Band, l = Low band, g = Latin America, u = USA) m = Mode (v = Valid, i = Invalid)*

* The Mode bit is used to evaluate the Satellite, Polarization & Band combination vs. the Frequency/Symbol Rate/FEC currently in RAM. This bit will be set to invalid if the Frequency for the selected combination is set to 0x0000; otherwise it will be set to valid. For example the Mode bit will be set to invalid when the frequency is set to 00000 to indicate that there is not a frequency to track for the LNB tone and voltage setting.

Report RF Tracking Parameters

Function:	reports all RF tracking parameters for primary & secondary satellites*
Command:	**@SATCONFIG**
Response:	F,x,fffff,S,C,ID,P,B,D<cr>
Where:	x = Satellite (a = Primary, b = Secondary) fffff = Frequency in MHz (00000 and 10700 to 12700) S = Symbol rate in Mbit/Sec (1000 to 29999) C = FEC code rate (valid rates = 12, 23, 34, 56, 67, 78) ID = Satellite Network ID in hexidecimal format (valid range = 0x0000 to 0xffff hex) P = LNB Polarization (v = Vertical, h = Horizontal, r = Right, l = Left) B = the LNB down conversion frequency (l = low, h = high, G = Latin America, U = USA) D = decoding type (0 = test, 1 = DSS-A, 2 = DSS-B, 3 = DVB)

* This command dumps all eight combinations of the Satellite/Freq/Sym/FEC/ID/POL/Band/Decode currently stored in RAM.

Set RF Tracking Parameters

Function:	sets RF tracking parameter
Command:	**@SATCONFIG,X,N,F,S,C,ID,P,B,D<cr>**
Response:	Echoes the input data
Where:	@SATCONFIG = directs data to the RF Board X = satellite location A or B N = satellite table # (98 & 99 are slots for user-configured satellites) F = frequency in MHz (either 00000 or a range from 10700 - 12700) S = the satellite transponder symbol rate in Mbit/second (01000 - 29999) C = the FEC code (e.g., 12, 23, 34, 56, 67, 78) ID = the satellite network ID in hexidecimal format (0x####) P = the LNB polarization (v = vertical, h = horizontal, r = right, l = left) B = the LNB down conversion frequency (l = low, h = high, G = Latin America, U = USA) D = decoding type (0 = test, 1 = DSS-A, 2 = DSS-B, 3 = DVB)

ID Match/Decoded Network ID

Function:	report ID match and decoded network ID
Command:	**@CHECKID**
Response:	Y,0X#### N,0X#### Y,NoID N,NoID
Where:	Y = yes N = no 0X#### = network ID NoID = satellite unidentified

E.7 Installation Commands

Table E-7
Installation Commands

Set/Report GPS Position

Function:	reports or sets default GPS position
Command:	**GPS<cr>** **GPS,XX,D,YYY,E**
Response:	GPS = XXD YYYE<cr> GPS: XXD YYYE
Where:	XX = latitude (0-90) D = S (South) or N (North) YYY = longitude (0-180) E = E (East) or W (West)

Report Satellite Names

Function:	report names for satellites A and B
Command:	**SATINSTALL**
Response:	SATINSTALL,<sat_a_name>,<sat_b_name>

Report Configured Satellite Names

Function:	report names for all configured satellites
Command:	**SATLISTA**
Response:	SATLISTA,<sat_name1>,...,<sat_nameX>

Report Valid Satellite B Selections

Function:	report names for all valid satellite B selections for a given satellite A selection
Command:	**SATLISTB,<sat_a_name>**
Response:	SATLISTB,<sat_a_name>,<sat_b_name1> ...,<sat_b_nameX>

Install Satellite Pair

Function:	installs satellites A and B as the satellite pair
Command:	**SATINSTALL,<sat_a_name>,<sat_b_name>**
Response:	if valid pair, echoes the input data if invalid pair, returns error message

Configure Longitude of a User-configurable Satellite

Function:	configures one of the user-configurable satellites with the longitude provided
Command:	**SATCONFIG,USERX,YYY,Z,D,L**
Response:	if valid pair, echoes the input data if invalid pair, returns error message
Where:	X = 1 or 2 YYY = longitude (0-180) Z = E (East) or W (West) D = decoding type (0 = test, 1 = DSS-A, 2 = DSS-B, 3 = DVB) L = LNB polarization (C = circular, L = linear)

E.8 Debug Commands

Report Offset Angles

Function:	reports system offset angles
Command:	**OFFSETS** **OFFSETS,XXXXX,YYYY**
Response:	Offsets = XXXXX.X XXXXX.X
Where:	X = new azimuth offset (-1800 - 1800) Y = new elevation angle (-450 - 450)

Table E-8
Debug Commands

Apply Default Values to Default Satellites

Function:	updates the default satellites to the default values
Command:	**SATPAIR,X**
Response:	displays numerous frequency commands and reports “Satellite Installation Complete”
Where:	X = 0 (satellites default to Astra1 & Hotbird) ***or*** X = 1 (satellites default to Expressvu and Echo_119) ***or*** X = 2 (satellites default to DSS_101 and DSS_119) ***or*** X = 3 (satellites default to Galaxy West and None)

Report Last Satellite Tracked/Update Value

Function:	reports the last satellite tracked or updates the last tracked satellite to the value input if it is different from the current value
Command:	**LASTSAT** **LASTSAT,X**
Response:	Last = <sat_name>
Where:	X = A (updates to Satellite A) ***or*** X = B (updates to Satellite B)

Appendix F
Patent Protection*

One or more of the following patents protect the technology in KVH fiber optic gyros:

Patent Number	Country
6,429,939	United States
4,697,876	United States
574,343	Australia
1,240,015	Canada
P34 84 284.5	Germany
1,870,145	Japan
0 127 257	EPO, France, Germany, United Kingdom
4,712,866	United States
2076012	Japan
0 254 462	EPO, France, Germany, United Kingdom
4,668,264	United States
4,950,318	United States
1,236,322	Canada
1,304,566	Canada
2,509,580	Japan
0 215 674	EPO, France, Germany
4,755,021	United States
4,669,814	United States

** Foreign patents pending*

KVH Industries Limited Warranty
TracVision G8

Limited Warranty on Hardware

KVH Industries, Inc. warrants the KVH product purchased against defects in materials for a period of TWO (2) years and against factory labor costs for a period of ONE (1) year from the date of original retail purchase by the original purchaser. It is the customer's responsibility to verify the date of purchase by returning the warranty card included with the product to KVH within 30 days of purchase, or by providing a copy of a dated sales receipt for the KVH product under warranty with the warranty claim. If this date cannot be verified, the warranty period will begin 30 days after the date of manufacture of the original product purchased.

If you discover a defect, KVH will, at its option, repair, replace or refund the purchase price of the product at no charge to you, provided you return it during the warranty period, transportation charges prepaid, to the factory direct. Please attach your name, address, telephone number, a description of the problem and a copy of the bill of sale or sales receipt as proof of date of original retail purchase, to each product returned to warranty service. Alternatively, you may bring the product to an Authorized KVH dealer/distributor for repair. During the first year, and if the product was installed by an Authorized KVH dealer/distributor (identified with the KVH Authorized dealer/distributor list), KVH will cover the dealer's/distributor's labor charges for warranty repairs, provided the dealer/distributor contacts KVH for pre-approval of the charges. Approval of charges is at KVH's sole discretion.

This Limited Warranty does not apply if the product has been damaged by accident, abuse, misuse or misapplication or has been modified without the written permission of KVH; if any KVH serial number has been removed or defaced; or if any factory-sealed part of the system has been opened without authorization.

Return Authorization

A Return Material Authorization is required prior to returning the product to KVH Industries. Please call our Technical Support Department at +1 401 847-3327 or send an e-mail to techs@kvh.com to obtain the RMA number. Write the number in large, clear characters on the outside of the box. To avoid confusion and misunderstandings, shipments without an RMA number clearly visible on the outside box will be refused and returned to you at your expense. If possible, use the original box and packing material to protect the equipment from damage in shipment. KVH assumes no responsibility for warranty shipments from the customer to the factory if not shipped in the manner prescribed above.

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